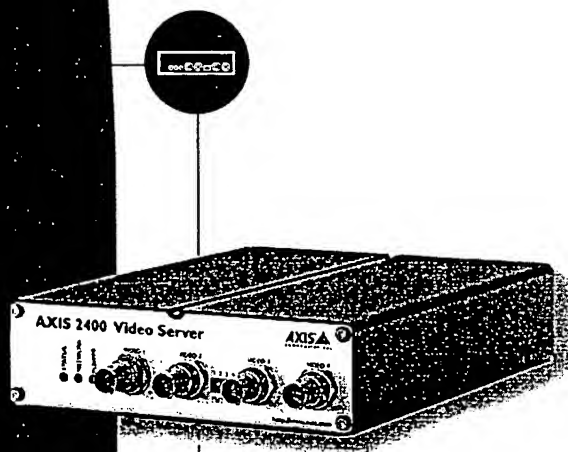# AXIS Video Servers

(The Plug-and-Watch Remote Monitoring and
Surveillance Solution for TCP/IP Networks

AXIS 2400/2401 Administration Manual Version 1.1

THIN
SERVER
TECHNOLOGY
BY AXIS

AXIS
COMMUNICATIONS

# Quick Installation Procedure

To get your AXIS 2400/2401 up and running on an Ethernet network, follow these instructions:

1. Note the serial number found on the underside label of the AXIS 2400/2401. The Ethernet address is the same as the serial number of the unit.
2. Connect the video camera(s) to the AXIS 2400/2401.
3. Connect your AXIS 2400/2401 to the network.
4. Connect the external power supply.
   Note: The power supply supplied with your product is country specific. Refer to *Checking the Hardware Inventory,* on page 11 and check that the type of power supply is correct.
5. Acquire a valid and unused IP address for the Video Server from your Network Administrator.
6. Assign the IP address using either the AXIS IP Installer program or ARP command, as described below:

Easy - AXIS IP Installer

7a. *Windows 95/98 & NT* - Install the AXIS IP Installer. You will find the installation program on the AXIS Online CD and on the Axis Web Site at http://www.axis.com

7b. Run the AXIS IP Installer from the Start menu.

7c. Restart your AXIS 2400/2401.
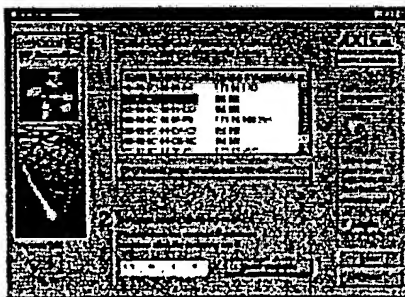
7d. Locate and select the serial number of your AXIS 2400/2401 in the list.

7e. Enter the desired IP address, and click Set IP address.

8. To access the Video Server Home Page, click **Home page of selected Axis-server...**

Quick - ARP/PING

7. *Windows 95/98 & NT* - Start a DOS window and type these commands:
   arp -s <Server IP address> <Ethernet address> <my PC IP address>
   ping <Server IP address>

Example
   arp -s 172.21.1.200 00-40-8c-10-00-86
       172.21.1.193
   ping 172.21.1.200

   UNIX & OS/2 - Type these commands:
   arp -s <IP address> <Ethernet address> temp
   ping <IP address>

Example
   arp -s 172.21.1.200 00:40:8c:10:00:86 temp
   ping 172.21.1.200

8. To access the camera server Home Page, start your Web browser and enter the IP address in the location/address field:
   http://<IP address>/

Example
   http://172.21.1.200/

The installation is complete. Access the Web-based Administration Tools and configure the AXIS 2400/2401 to suit your user requirements.

AXIS 2400 and AXIS 2401 Video Servers

Administration Manual

About This Document

This manual is intended for both administrators and users of the AXIS 2400/2401 Video Server, and is applicable for software release 1.0. It includes simple step-by-step instructions for configuring, managing and using the AXIS 2400/2401 Video Server within your networking environment.

It is not necessary for the reader to have any previous networking experience to install or use this product, although some knowledge of UNIX systems would be beneficial for developing custom programming scripts.

Readers are recommended to use this document as a supplement to the Wizards and other on-line information available via the Web-based interface. Superseding versions for this document will be posted to the Axis Website, as required.

Safety Notices

Please observe all safety markings when using this product.
Caution! - Potential hazard that can damage the product.

Important! - Potential hazard that can seriously impair operation.
Do not proceed beyond any of the above notices until you have fully understood the implications.

Legal Considerations

Camera surveillance can be prohibited by laws that vary from country to country. Check out the laws in your local region before using the AXIS 2400/2401 for surveillance.

Electromagnetic Compatibility (EMC)

USA - This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his/her own expense will be required to take whatever measures may be required to correct the interference. Shielded cables should be used with this unit to ensure compliance with the Class A limits.

Europe $C \in$ - This digital equipment fulfills the requirements for radiated emission according to limit B of EN55022/1994, and the requirements for immunity according to EN50082-1/1992 residential, commercial, and light industry.

Liability

Every care has been taken in the preparation of this manual; if you detect any inaccuracies or omissions, please inform your local Axis office which can be found on the cover of this document. Axis Communications AB cannot be held responsible for any technical or typographical errors and reserves the right to make changes to the product and manuals without prior notice. Axis Communications AB makes no warranty of any kind with regard to the material contained within this document, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Axis Communications AB shall not be liable nor responsible for incidental or consequential damages in connection with the furnishing, performance or use of this material.

Year 2000 Compliance

Axis Communications AB warrants that this product is Year 2000 compliant.

Trademark Acknowledgments

Acrobat, Adobe, Ethernet, IBM, Internet Explorer, LAN Manager, Macintosh, Microsoft, Netscape Navigator, OS/2, UNIX, Windows, WWW are registered trademarks of the respective holders. Java and all Java-based trademarks and logos are trademarks or registered trademarks of Sun Microsystems, Inc. in the United States and other countries. Axis Communications AB is independent of Sun Microsystems Inc.

Support Services

Should you require any technical assistance, please contact your local dealer. If your questions cannot be answered immediately, your dealer will forward your queries through the appropriate channels to ensure you a rapid response. If you are connected to Internet, you can obtain on-line manuals, technical support, software updates, application software and general corporate information from any of the locations listed below.

Axis' CCTV Website	http://cctv.axis.com/
WWW:	http://www.axis.com
FTP:	ftp://ftp.axis.com/pub/axis

Table of Contents

Product Overview

Axis' Video Servers include a built-in Web server that enhances traditional surveillance systems and provides added networking connectivity for distributing monitored images over a secure intranet network, or even the Internet. Video camera management, configuration, and monitoring - all at your fingertips through a standard Web browser; such as, Netscape Navigator or Microsoft Internet Explorer.

The following models are currently available:

The AXIS 2400 Video Server - Connecting directly to Ethernet or Fast Ethernet networks, the AXIS 2400 Video Server supports up to four PAL/NTSC video cameras and is programmable for both NTSC and PAL video systems.
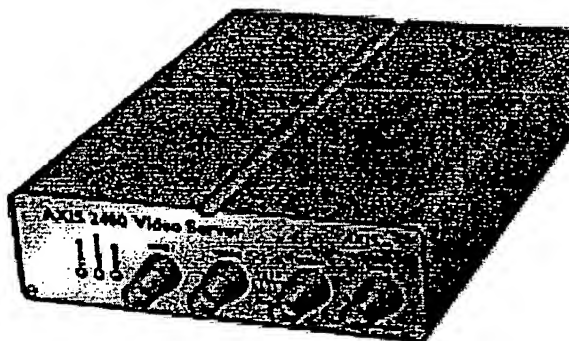
The AXIS 2401 Video Server - Connecting directly to Ethernet or Fast Ethernet networks, the AXIS 2401 Video Server provides a single video input that accommodates any standard composite video source and a loop-through video output connector. The AXIS 2401 is available for NTSC or PAL video systems.

Both product variants include a Web-based interface featuring several user-friendly Wizards that not only simplify the installation process, but also allow for a seamless and automated integration into your networking environment and custom applications. Furthermore, its open-network structure minimizes the need for costly coax cabling and optimizes imaging broadcasting for a minimal connection overhead.

The AXIS 2400/2401 is the smart and cost-effective solution for the sophisticated demands of a modern interactive surveillance and remote monitoring system. Simple to install - and easy to use!

Features and Benefits

Ease of Use - The AXIS 2400/2401 has plug-and-picture functionality - all you need to do is assign a valid IP address. The only software required is Microsoft Internet Explorer 4.x (used with Axis' ActiveX component), or Netscape 4.x or above.

Cost-effective - Increases image distribution with minimal connection overhead to provide a reliable and low-cost resource for network imaging. Absolutely no hidden accessories; such as, expensive software, management workstations or dedicated video cabling, is required.

Open Standards Environment - Supporting TCP/IP networking, SMTP e-mail, HTTP and other Internet-related protocols; the AXIS 2400/2401 can be used in mixed operating system environments; such as, Windows, UNIX, Macintosh and OS/2.

Simple Administration - Using a standard Web browser, you configure and manage the AXIS 2400/2401 directly from its own Web pages. When a new firmware release becomes available, you can batch upgrade all of your Axis Video Servers remotely over the network using the AXIS ThinWizard.

Standard Image Format - The AXIS 2400/2401 generates high-quality pictures in standard JPEG format, which can be viewed using any standard Web browser.

Picture Updating - The on-board ETRAX 100 processor and revolutionary AXIS ARTPEC-1 Real Time Picture Encoder provides an amazing power-synergy to deliver up to 30 frames over 10Mbps or 100Mbps networks.

Wide Range of Applications - The AXIS 2400/2401 offers live video over the network for enhancing and modernizing traditional CCTV systems - and much more.

The AXIS 2400/2401 allows remote CCTV and video access directly from a standard Web browser. Users can access live images or remotely control CCTV at any time anywhere. Accordingly, the AXIS 2400/2401 can be used for: verifying intruder alarms, traffic surveillance, banking applications, parking lots, factory monitoring, industrial surveillance, visual security systems, image archiving, etc. SMTP e-mail is supported which allows images to be sent as e-mail attachments at predetermined times or events.

External Device Connection - The auxiliary inputs make it possible to trigger the AXIS 2400/2401 from external devices, e.g. IR-sensors, switches, alarm relays etc.

Pan/Tilt Device Connection - Via an RS232 or RS485 serial interface, you can combine the AXIS 2400/2401 with a Pan/Tilt device for automatically adjusting camera orientation.

Security - The AXIS 2400/2401 includes a self-contained Web server. This means that the camera server is secured like any other Internet host. The Network Administrator can decide whether individuals, groups, the whole company or the whole world may access your video server. This protection is normally implemented using the user security settings within the AXIS 2400/2401 or in combination with an organization's Internet firewall.

Web Forum Discussions - Axis Communications have a Web forum for ideas and suggestions for possible camera applications. Axis also maintain a collection of interesting links where you can insert your own link to your application and keep lists of application notes, FAQs and other related information.

Network Camera Servers Developer's Pages - The Camera Division at Axis maintain a specialist site for network camera developers. New exciting application ideas, tools, and preprogramming scripts are constantly being added - this is an invaluable reference site for Axis' development partners and OEMs. Follow the camera links and check it out at: http://cctv.axis.com/ and http://www.axis.com/

Physical Description

Read the following information to familiarize yourself with the AXIS 2400/2401, making particular note of where the connectors and indicators are located. This information provides a useful reference during the installation of the product into your networking environment.

The Front Panel
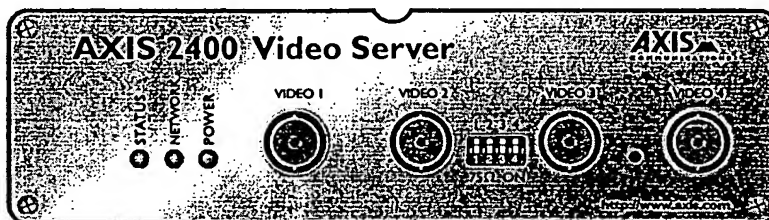
AXIS 2400 Front Panel

AXIS 2401 Front Panel

Video Inputs - The AXIS 2401 allows a single video source to be connected via the VIDEO IN connector; the AXIS 2400 accommodates up to 4 separate video sources (VIDEO 1- VIDEO 4) simultaneously.

Each supported video input is terminated using a coax/BNC connector. Physical connections made using RG59, 75 ohm coax video cable; have a recommended maximum length of 800 feet (250 meters).

Video Output (AXIS 2401 only) - A single video output (VIDEO OUT) terminated with a coax/BNC connector allows direct connection of an external monitor.

**DIP Switches** - DIP switches provide the line termination for each supported video input. All units are shipped with the line termination *enabled* for each supported video input; that is, with the DIP switches set in the down-position.

If the AXIS 2400/2401 is to be connected in parallel with other equipment, disable the input termination by turning the corresponding DIP switch to the up-position (OFF). Failure to do this can cause the picture quality to be impaired.

Status Indicator - The multi-colored status indicator defines the operational status of the server, as described below:

• green - the indicator flashes briefly and momentarily displays orange during the start-up and self-test routines; the indicator then displays green to indicate a healthy unit status.

• red - the indicator will display red only if a problem with the AXIS 2400/2401 has occurred. Refer to *Appendix A - Troubleshooting.*

Note: The Status indicator also displays orange when setting the factory default settings, as described in *Reinstating the Factory Default Settings,* on page 25.

Network Indicator - After completion of the startup and self test routines, the multi-colored Network Indicator flashes independently, as follows:

• yellow - indicating network activity on a 10Mbps Ethernet network

• green - indicating network activity on a 100Mbps Fast Ethernet network

• red - indicating no physical connection to the network.

Power Indicator - The Power indicator is normally lit while power is applied. If it is not lit, or it flashes, there is problem with the AXIS 2400/2401 external power source.

Control Button - Located centrally between the supported video input connectors on the AXIS 2400, and to the left of the loop-through video output on the AXIS 2401; this button is recessed within the product casing. Using a suitably pointed object, you press this button to restore the factory default settings, as described in *Reinstating the Factory Default Settings,* on page 25.

Serial Number - Located on the underside label of the AXIS 2400/2401, the serial number is identical to the Ethernet address of the unit.

The Rear Panel
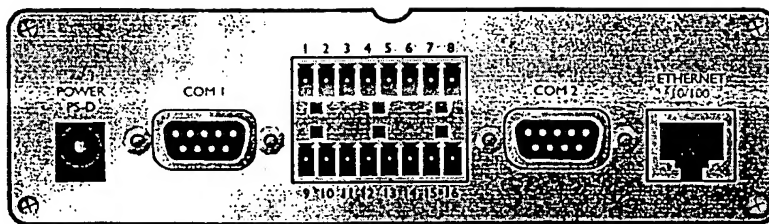
AXIS 2400/2401 Rear Panel

I/O Terminal Block - The I/O Terminal Block connector is located between the two serial ports on the rear panel and provides the physical interface to one relay switch output, four digital photo-coupled inputs, and an RS-485 interface. For details, refer to *Appendix F - The IO Terminal Block.*

Use this connector for transmitting data over a multi-drop communication lines, RS485 Pan Tilt devices, and external triggering - typically associated with CCTV equipment. The connector can be utilized as an alternative connection point for DC supply to the unit.

RS-232 Serial Connectors - Two 9-pin D-sub connectors providing RS-232 serial connection, one of which is multiplexed with the RS-485 port via the Terminal Block Connector. Typically used for Pan/Tilt device interface.

Network Connector - The AXIS 2400/2401 is designed for 10 Mbps Ethernet and 100 Mbps Fast Ethernet networks and connects to the network via a twisted pair category 5 cable (10baseT and 100baseTX) terminated using a standard RG-45 connector. Supporting NWAY, the AXIS 2400/2401 detects the speed of the local network segment and varies the speed of data communication accordingly, between 10 Mbps and 100 Mbps.

Power Supply Connector - A single Jack socket (PS-D) for connection of AXIS 2400/2401 power supply. The terminal block connector provides an auxiliary connection point for AC or DC power to the unit.

Note: The power supply supplied with your AXIS 2400/2401 is country specific. Please check that the type of power supply you are using is correct. See page 11.

Installation

Follow the instructions included in this section to install the AXIS 2400/2401 into your networking environment. Each phase of the documented installation procedure is summarized below:

- Checking the Hardware Inventory
- Connecting the AXIS 2400/2401
- Assigning an IP Address
- Verifying the Installation

Checking the Hardware Inventory

Unpack and check all the items against the check list below. Contact your dealer if anything is missing or damaged. All packing material is recyclable.

Hardware	Model Variants	Part Numbers
Video Server	AXIS 2400	0092-001-01
	AXIS 2401 (NTSC)	0092-007-01
	AXIS 2401 (PAL)	0092-008-01
Power Supply	Europe	14233
(PS-D)	UK	14234
	Australia	14255
	USA	14253
	Japan	14254
Media	Title	Part Numbers
CD-ROM	AXIS Online CD	-
Printed Materials	AXIS 2400/2401 Administration Manual	16741

AXIS Online CD

The AXIS Online CD supplied with this product provides an easy-to-use electronic catalog that includes all of the latest AXIS Utilities Software, Product Software, White Papers, User Documents, Technical References, Technical Notes, etc. It is compatible for use within all of the supported Axis computing environments.

You can view the contents of the AXIS Online CD via the Adobe Reader interface or HTML interface. All documents presented on the CD are in PDF format.

Notes: If Adobe Acrobat Reader 3.0 is not installed on your system:

- Windows users can click the Get Adobe Reader button from the main user interface.
- Non-Windows users can locate and run the appropriate installer from the tools/Acrobat/ folder. Refer to the readme.txt file for full path name details.

Connecting the AXIS 2400/2401

The AXIS 2400 accommodates up to four coax/BNC connected video sources; whereas, the AXIS 2401 allows single video connection with a loop-through video output for connection to an external monitor. The AXIS 2401 Web applications also support integrated image feed from other Axis camera and video servers on the network within a single-presentation interface.

Both models display video images in single, or traditional quad picture format, delivering up to 25 PAL and 30 NTSC frames/second over 10/100Mbs networks.

Notes: • NTSC delivering 525 lines of resolution at 60 half-frames per second is the common standard in the United States; whereas, PAL delivers 625 lines at 50 half-frames per second and is the dominant television standard in Europe.

• The AXIS 2401 is supplied as either an *NTSC or PAL-specific unit*. The AXIS 2400 is programmable for both PAL and NTSC operation.

Connecting your Camera(s)

Connect the video output of your camera(s) to the AXIS 2400/2401 video port(s) using standard 75 ohm coaxial video cable, terminated with a BNC-connector.

Notes: • The AXIS 2400/2401 will experience lower image framerate when simultaneously accessed by multiple clients. In particular, you will notice this on the AXIS 2400 when two or more different video sources are accessed simultaneously.

• Use a BNC-to-RCA converter if your camera is supplied with a standard phono-type (RCA) connector.

Connecting your Server to the Network

Follow the instructions below to connect the AXIS 2400/2401 to your network:

1. Note the serial number of your AXIS 2400/2401 for future reference during the installation procedure. This is located on the underside label of the unit.

2. Connect your video server to the network with twisted pair category 5 cable (10baseT or 100baseTX) terminated using a standard RG-45 connector.

3. Connect the power supply to the video server.

4. Check that the Power Indicator is constantly lit.

Assigning an IP Address

To enable access to your video server you must first assign it an appropriate IP Address.

Before you begin:

- Make sure the AXIS 2400/2401 is powered up and attached to the network.
- IP Address: Acquire an unused IP address from your Network Administrator.
- Server Privileges: You need root privileges for UNIX; administrator privileges for Windows NT.
- Ethernet Address: Each AXIS 2400/2401 is pre-configured with a unique Ethernet Address that is based upon the unit serial number, which you can find printed on the underside label of the unit. You will need to know the Ethernet address of your AXIS 2400/2401 to install the unit.

Mapping a Host Name to the IP Address

If you are using host names, you can map a unique host name to the acquired IP address. Refer to your system manuals or Network Administrator for instructions on how to perform the name mapping on your particular system.

Note: If the host name has not been included in the system host table, you can still perform the following instructions on how to download the IP address. In this case, simply replace the host name entry with the IP address wherever required.

Choosing an Appropriate Method

Set the IP address using an appropriate method for your operating system from the table below:

Method	Operating Systems	Refer to...
AXIS IP Installer	Windows 95/98 and NT	*"Using the AXIS IP Installer"* on page 14
ARP Requires the IP address for each new device to be downloaded individually and is not appropriate for use over routers.	Windows 95/98 and NT	*"Using ARP in Windows 95/98 and Windows NT"* on page 15
	UNIX, OS/2	*"Using ARP in UNIX and OS/2"* on page 15
RARP Requiring a RARP daemon on your system, this method downloads the IP address to each device automatically and operates within a single network segment only.	UNIX	Refer to *Using RARP in UNIX,* on page 16.
BOOTP Requiring a BOOTP daemon on your system, this method operates over the entire network. A request to an active daemon initiates a search of the boot table to find an entry matching the unit's Ethernet address. The daemon downloads the IP address to the device if a match is found.	UNIX	Refer to *Using BOOTP in UNIX,* on page 16

Important!

When installing your AXIS 2400/2401, do not use the default or the IP address featured as examples within this document. Always consult your Network Administrator before assigning an IP address.

Using the AXIS IP Installer

The AXIS IP Installer is a Windows 95/98 & NT program that simplifies the procedure for setting IP addresses within Axis' networking products; it also allows you to conveniently access the home Web page of any Axis ThinServer connected to your network. The program is available on the AXIS Online CD and from Axis' Websites at http://cctv.axis.com/ and http://www.axis.com/

Installing the AXIS IP Installer:

1. On the AXIS Online CD, click on the Software button.

2. Select the AXIS IP Installer and click Install. The AXIS IP Installer - Setup dialog is displayed on the screen.

3. Follow the instructions as they appear on the screen.

4. Click Finish to complete the setup.

Setting the IP Address with AXIS IP Installer:

1. Run the AXIS IP Installer from the Start menu. The AXIS IP Installer dialog is displayed on the screen.

2. Restart your camera server.

3. Select the serial number of your camera server in the list. The serial number is identical to the Ethernet address of the unit.

4. Enter the desired IP address. Click Set IP address. The IP address will now be set.

5. To access the home page of the camera server, click Home page of selected Axis-server... You can now configure the video server according to your requirements.

6. Click OK to exit the program.

For more help during the installation of the IP address, click Help or F1.

Using ARP in Windows 95/98 and Windows NT

To download the IP address and verify the communication, start a DOS window and type the following commands:

```
arp -s <server IP address> <Ethernet address>
ping <server IP address>
```

Example:

```
arp -s 172.21.1.200 00-40-8c-10-00-86
ping 172.21.1.200
```

The host will return 'Reply from 172.21.1.200 ...' or some similar message. This means that the address has been set and the communication is established.

Important!

```
Windows 95 only: When using the Windows 95 implementation of ARP, change the first line to:

arp -s <server IP address> <Ethernet address> <w95host IP address>, where <w95host IP address> is the IP
address of your Windows 95 host.

Example:
arp -s 172.21.1.200 00-40-8c-10-00-86 172.21.1.193
ping 172.21.1.200
```

Note: When you execute the PING command for the first time, you will experience a significantly longer response time than usual.

Using ARP in UNIX and OS/2

To download the IP address and verify the communication, type the following commands:

```
arp -s <server IP address> <Ethernet address> temp
ping <server IP address>
```

Example:

```
arp -s 172.21.1.200 00:40:8c:10:00:86 temp
ping 172.21.1.200
```

The host will return '172.21.1.200 is alive', or some similar message to indicate that the address has been set and the communication is established.

Note: When you execute the PING command for the first time, you may experience a significantly longer response time than usual.

Using RARP in UNIX

Follow these steps to use the RARP method in UNIX:

1. Append the following line to your Ethernet Address table. This is typically performed using the command /etc/ethers:

```
<Ethernet address> <host name>
```

Example:

```
00:40:8c:10:00:86 videoserv
```

2. If necessary, update your host table and alias name databases as described required by your system.

3. If it is not already running, start the RARP daemon, typically done using the command rarpd -a.

4. Restart the AXIS 2400/2401 to download the IP address.

Using BOOTP in UNIX

Follow these steps to use the BOOTP method:

1. Append the following entry to your boot table. This is typically done using the command /etc/bootptab:

```
<host name>:ht=<hardware type>:vm=<vendor magic>:\
:ha=<hardware address>:ip=<IP address>:\
:sm=<subnet mask>:gw=<gateway field>
```

where:

```
ht    = ether
vm    = rfc1048
ha    = The Ethernet address of the AXIS 2400/2401
ip    = The IP address of the AXIS 2400/2401
sm    = The subnet mask
gw    = The default router address
```

Example:

```
videoserv:ht=ether:vm=rfc1048:\
:ha=00408c100086:ip=172.21.1.200:\
:sm=255.255.255.0:gw=172.21.1.1
```

2. If necessary, update your host table and alias name databases as described required by your system.

3. If it is not already running, start the BOOTP daemon. This is typically done using the command bootpd.

4. Restart the AXIS 2400/2401 to download the IP address, default router address, and subnet mask.

Verifying the Installation

After assigning an IP address, verify the connection between the AXIS 2400/2401 and the network:

1. Start your Web browser (see note below) and enter the name or IP address in the Location/Address field:

Example

> http://172.21.1.200/

Important!

When using Microsoft Internet Explorer for the first time, you must then temporarily lower your security settings to perform a one-time-only installation of Axis' ActiveX component onto your workstation, as described below:

- From the View menu, select Internet Options
- Click the Security tab and make note of your current security settings
- Set the security level to Low and click OK
- Type the Internet Address or Host Name of your AXIS 2400/2401 into the Location field
- A dialog asking if you want to install *ATLCamImage.ocx* will appear. Click yes to start the installation
- Once the AxtiveX installation is complete, return the security settings to their original value, as noted above

Note: This functionality is currently under review in order to increase ease-of-use; new instructions relating to this will shortly will be available from our Website http://cctv.axis.com/

2. The Welcome Page of your AXIS 2400/2401 is now displayed:
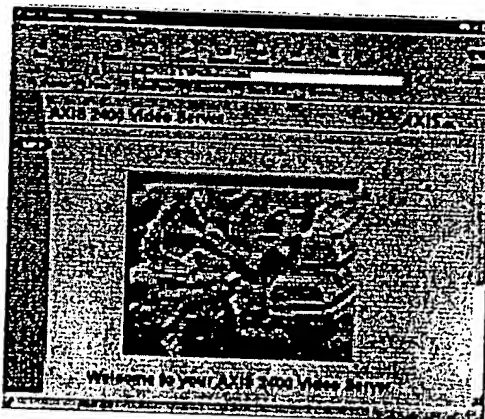
3. To continue the setup process and configure your own application, click the Admin button in the top left corner of this window and proceed to *Configuring the Video Server,* on page 18. Log on as user *root* with the default password *pass*.

Note: Web pages are kept locally for fast browsing, and your browser may occasionally display a cached image as opposed to a newly taken snapshot. When this happens, simply click Reload/Refresh in your Web browser. Some browsers may even force you to clear the cache, or use forced reload, e.g. Shift+Reload in Netscape.

Configuring the Video Server

This section is targeted specifically to personnel responsible for the administration of the AXIS 2400/2401. The *Administrator(s)* is granted with high-level privileges denied to the ordinary *user(s)*.

Before you begin:

To access the AXIS 2400/2401 configuration pages, you must first set the Internet address as described in *Assigning an IP Address* on page 13.

You configure the AXIS 2400/2401 from a standard Web browser such as Netscape Navigator or Microsoft Internet Explorer.

As a viable alternative to managing and configuring the AXIS 2400/2401 using a Web browser, you can alternatively edit the system configuration file using a text editor and upload the file to the AXIS 2400/2401 using FTP. For further information please refer to *Configuring using FTP*, on page 33.

Overview of the Administration Tools

The Web-based Administration tools are displayed in a graphical user interface that allows simple point-and-click display of the system tools. Several user-friendly Wizards are provided to guide you through every aspect of the installation; from designing the user interface and configuring the supported networking protocols, right down to integrating the unit into your specific application environment - it is incredibly easy!

Important!

On-line help ⊞ is available on every page within the AXIS 2400/2401 Web interface. This information is of particular relevance when configuring the unit and should be used as a first point of reference for resolving any administration queries. The help system is stored internally in the AXIS 2400/2401.

Following the instructions provided within this section, use the Web-based Administration tools for configuring and managing your AXIS 2400/2401.

Accessing the Tools

Follow the instructions below to access the Administration tools using a standard Web browser:

1. Start the Web browser and enter the name or Internet address of the AXIS 2400/2401 on the location/address field.

Example

```
http://172.21.1.200/
```

Important!

If this is the first time you have accessed the AXIS 2400/2401, the Welcome page will be now be displayed. In this case, click the Administration button and proceed to configure your application using the Installation Wizard prior to proceeding with the next step.

Note: When accessing the AXIS 2400/2401 for the first time using Microsoft Internet Explorer, you must temporarily lower your security settings to perform a one-time-only installation of Axis' ActiveX component onto your workstation, as described on page 17.

The *Administrator(s)* can choose not to display the Administration and other navigational buttons from the user interface. Selecting this feature within in a Wizard ultimately means that the Administration tools can then only be accessed by entering the full *Admin* address into the URL of the Web browser; for example: http://172.21.1.200/admin.html

2. Your defined **Application** page is now displayed. Click the **Admin** button to display the Administration Overview page and access the system *Administration tools.*

Note: A prompt for a *username* and *password* is displayed when entering these pages for the first time in a Web browser session. At the prompt, log on as *root* and use the default password *pass*. It is recommended that you change the password of your AXIS 2400/2401 as soon as possible.

3. The various components of your video system are represented as icons within the displayed graphic. Simply click the component part you want to configure. As an *Administrator,* you configure and modify the system directly from this page.
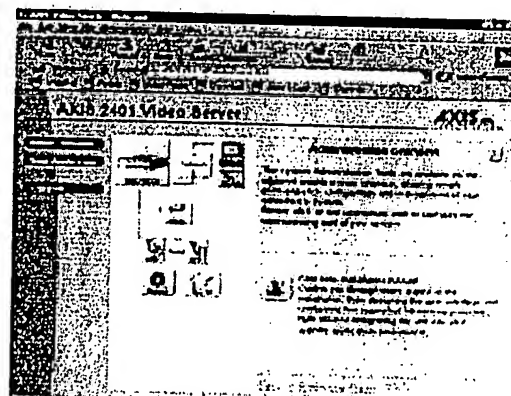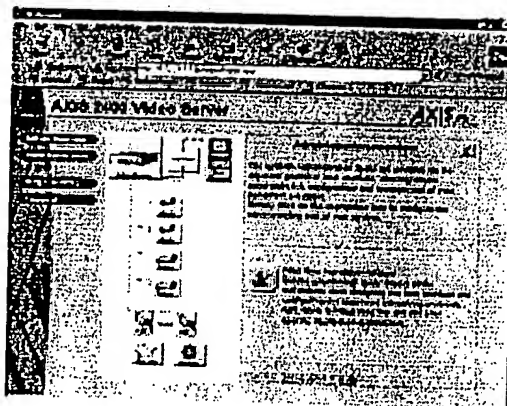
Tools Overview

The following table provides a one-stop overview of the information and services available from the Administration pages:

Service	Description
Administration Overview	• The First-time Installation Wizard allows novice administrators to automatically set the most important system parameters and quickly establish an appropriate application for the system users.
View Application	• Displays the page and picture format that is presented to your users. Use this page as a a reference after making any changes to your application design.
Help Contents	• Displays the table of contents for the On-line Help
Support	• Displays support and trouble-shooting information.
Design Application Settings	• Layout and Programming Wizard: design the look-and-feel of the user interface with an easy-to-use Wizard. Choose Surveillance System or Web Attraction preconfigurations and refine the application specifically for your user needs. • Programming Script Editor: create programming scripts yourself using the embedded text editor - recommended for advanced users only.
Network Settings	• Specify the system settings for each of the supported networking protocols, using a Wizard or manually via the Detailed View; including: - TCP/IP (Network settings) - DNS (Domain Name System) - SMTP (E-Mail).
Video Server Settings	• Set the system date & time, manually or automatically • Define the username and password for administratror(s) and user(s) • View parameter list and log file • Emergency Settings: Restart the unit or set server parameters to factory default.

Specific Settings	Description
Video Settings	Enable/Disable video sources and specify which Pan Tilt driver (serial port) the attached video camera is connected to - if any. **Note:** Two different icons are displayed to differentiate video sources not connected to Pan Tilt devices (icon-left) from those that are (icon-right). For each source specify:

- Image settings: set the image features; such as: displaying text, clock, color or Black & White etc
- Video Input/Modulation: to define the video transmission standard automatically or manually.
- Preset Positions: used for creating Pan Tilt and Zoom preset conditions and only visible if the selected video source is connected to a pan tilt device.

Configure Serial Port	For each of the two supported serial ports specify:

- Purpose: Pan Tilt, Generic or None.
- Interface Mode/Serial mode: RS485 or RS232 (Port 1 only).
- Communication settings: Baud Rate (bps), Data Bits (length), Stop and Parity Bits

Pan Tilt Settings	A Pan Tilt icon is displayed underneath a Serial Port icon only if the *purpose* of the respective serial port is defined as Pan Tilt. Select the Pan Tilt driver and define the driver specific settings: Canon VC-C3, Sony EVI-D30, Sony EVI-D31, Sony EVI-G20, Sony EVI-G21, VideMech, Ernitec, ICU and Diamond Smartscan are all supported.
Generic Settings	A Generic Icon is displayed underneath a Serial Port icon only if the *purpose* of the respective serial port is defined as Generic. The Generic driver is often referred to as terminal server or serial server and enables complete control of the Axis server serial ports from third-party client applications. Configure the port as an HTTP input/output or TCP input/output and save the changes.

Designing your Application

As an *Administrator*, you decide the general look and feel of the user interface and determine:

* the appearance of the *user* interface
* how video images are to be displayed to *user*
* the services and functions available to *user*

Click the Application Design icon within the graphic user interface to display the settings for your application.

Application - Layout

Design the layout of the application specifically to your users needs, using either the Wizard or Programming Text Editor.

Important!

The *Administrator* can choose not to display the Administration and other navigational buttons from the user interface. Selecting this feature within in the Wizard ultimately means that the Administration tools can then only be accessed by entering the full *Admin* address into the URL of the Web browser, as defined below:

http://172.21.1.200/html/admin.html

Using the Layout and Programming Wizard

From the Application Design page, click the Layout and Programming Wizard button and follow the on-line instructions to automatically configure the look-and-feel of the user interface.

You can choose Surveillance System or Web Attraction preconfigurations and refine the application specifically to your needs by selecting from several of the available features, including: alarm triggering, picture storage using FTP, image distribution via e-mail, etc.

You will find that the Wizard helps you not only to define the functionality of your system; such as: Quad system with or without pre/post alarm storage, picture size and magnification parameters, but also allows you to decide some of the more cosmetic aspects of system presentation; including: background, logo, user button and product title presentation.

Click the Finish button to save the defined configuration to the Video Server.

Tip!

Spend some time to go through the different Application Wizards and try various settings. Click the View Application button to view the results.

Wizard Overview

As a supplement to the information provided by the available Help, the table below provides a one-stop-reference for the parameters established by the Application Wizard:

Parameter	Options	Description
Image size	• Huge size (interlaced image, NTSC=704 x 480, PAL=704 x 576) • Full size (NTSC=352 x 240, PAL=352 x 288) • Half size (NTSC=176 x 112, PAL=176 x 144)	You can adjust the size and appearance of the displayed images: ranging from small, highly compressed pictures; to large, high-quality JPEG images. Typical file sizes for each of the available image sizes are dependent upon a number of different factors. Generally, low compression and large images sizes produce large filesizes; although higher quality images that include a lot of detail, will also increase resultant file size. Note: NTSC (60Hz) is the common standard in the USA, whereas PAL (50Hz) dominates in Europe.
Image Scale	x2 or x4	To allow an increase in the image display size without impacting network bandwidth, you can choose to scale your images by a multiple factors of two (x2) or four (x4). Increasing a *halfsize* image by x2 enlarges the picture area to that of a *fullsize* image - delivering a lower picture resolution, but using approximately one quarter of the network bandwidth demanded to display a fullsize image.
Page style	• Show gray background picture • Show title, line and Axis logo • Show buttons (e.g. Help, Admin)	The *Administrator* can choose not to display the Administration and other navigational buttons from the user interface. Selecting this feature within in the Wizard ultimately means that the Administration tools can then only be accessed by entering the full *Admin* address into the URL of the Web browser, as defined below: http://172.21.1.200/admin.html

Programming Script Editor

The Programming Script Editor editor offers advanced administrators and developers with an even greater level of flexibility for customizing the application specifically to meet their user needs. Using the on-line help as a reference, advanced users follow the instructions below to quickly develop programming scripts for time and/or alarm-triggered events:

Tip!

As a supplement to the information provided in the on-line help, the scripting language and syntax is also fully explained in *Appendix H- The Programming Script.* Several tips and examples are also provided.

1. Click the Programming Script Editor button to start the editor.

2. Enter a valid script in the main window and then click the Save button to deposit the script in product memory.

3. Check the Enable box to activate the programming scripts in your system.

Notes: •Scripts are not activated until the Enabled button is checked and the script is re-saved.

> •Saving new scripts automatically removes any existing script(s) previously saved with the Editor.

> •Previously saved scripts are automatically displayed when the Programming Script Editor is opened.

Server Settings

Click the Video Server icon within the graphic user interface to display and/or edit the following settings:

Date and Time

You click the Date and Time icon and set the current date and time either *Automatically*, or *Manually*. Setting the date and time *Automatically* requires you to provide the Internet Address of a local NTP server and select your local time zone from the available drop-down dialog.

Click Save to register the settings with the Video Server.

Security

To prevent any unauthorized use of the Video Server, access is strictly password protected and restricted to defined *Users* and the *Administrator(s)* only. *Administrator(s)* have exclusive access to the product Administration Tools and determine the registration of all ordinary *users*.

Notes: Although, the Administrator's default username and password (set to *root* and *pass* respectively) can be used for logging in to the unit for the first time, it is strongly recommended that you change the Administrator (root) password of your AXIS 2400/2401 as soon as possible - since all Axis products are shipped with the same password as default.

As an *Administrator*, you click the Security button to either:

*   define or edit the *Administrator* password (the Administrator username is permanently set to root, with password default to pass), or

*   define, add and delete *user* names and passwords

Important!

By default, the AXIS 2400/2401 supports anonymous user access, which means that anybody on the Internet/intranet has access to the video images from a Web browser.

Should you wish to restrict access, simply enter the usernames and passwords of authorized users in the General Settings - Security page. If the anonymous user service is satisfactory for your application, simply do not add any users.

Note: Only characters a - z, A - Z and 0 - 9 are valid when entering usernames and passwords.

The Log File

All system messages are recorded in a single log file and stored in product memory. Consequently, the file can be used as reference for examining system events. It can also serve as a useful diagnostic tool when attempting to resolve any problem that might occur. See also *Appendix A - Troubleshooting.*

Follow the instructions below to display all Video Server messages since the last *Restart* of the system:

1. Click the Video Server icon in the graphic interface.

2. Click the View Log File button. All recent commands are displayed in a separate window.

Viewing the Parameter List

The Parameter List provides a comprehensive list of all of the system parameters and their current settings. Follow the instructions below to display the list:

1. Click the Video Sever icon in the graphic interface.

2. Click View Parameter List to display the list.

3. Click Print to print a hard copy of the displayed list to your default printer.

Emergency Actions

In certain circumstances it may become necessary to restart or return the Video Server to its Factory Default settings, or initiate a hardware Restart of the unit. Both emergency actions can be initiated by clicking the appropriate button on this page.

Note: Clicking Factory Default deletes any previously defined layout and preprogramming configurations.

Reinstating the Factory Default Settings

Follow the instructions below to reinstate the factory default settings in AXIS 2400/2401:

1. Switch off the AXIS 2400/2401by disconnecting the power cord.

2. Using a suitably pointed object, press and continue to hold the Control button depressed.

Note: The Control Button is recessed within the product casing and located between the VIDEO 3 and VIDEO 4 input connectors on the AXIS 2400, and to the left of the VIDEO OUT connector on the AXIS 2401.

3. While continuing to hold the Control Button depressed, reconnect the power supply cable to the video server.

4. When the Status LED starts flashing yellow, release the Control Button for at least 2 seconds.

5. Press and continue to hold the Control Button until the Status indicator permanently displays yellow.

The AXIS 2400/2401 is now reset to factory default settings. Restart the AXIS 2400/2401 by disconnecting and then reconnecting the power cable.

Note: The Ethernet address remains unchanged, but all other parameters including the IP address are reset. Refer to *Assigning an IP Address,* on page 13 for details on how to set the IP number.

Network Settings

The AXIS 2400/2401 supports the following networking protocols that are configured directly via Network Settings:

- Transmission Control Protocol/Internet Protocol (TCP/IP) - used by the Video Server for transmitting data over the network.

- Domain Name System (DNS) - the Internet service used by the product for translating domain names into Internet Addresses.

- Simple Mail Transfer Protocol (SMTP) - this is the protocol for sending e-mail messages between e-mail servers on the network. The AXIS 2400/2401 can be pre-programmed to send images as e-mail attachments to pre-defined addresses.

Note: •DNS servers are only necessary if scripts with DNS names are used. If you do not use scripts or only use IP addresses in scripts, you need not enter a DNS server reference.

Click the Network icon within the graphic user interface, or click the Network Settings button to configure the above protocols, using the Wizard, or by clicking Detailed View.

Using the Wizard

The Wizard guides you through the setup procedures for each of the above protocols - one at a time. After completing one protocol, you optionally proceed to configure another protocol.

Clicking the Finish button on the last page of the Wizard saves the new settings to the Video Server.

Using the Detailed View

Clicking the Detailed View displays the Network Settings dialog which is navigated by clicking any visible tag. From this dialog you can display, edit and refine the settings for any supported network protocol.

Note: Any changes that you make are only implemented when you click the OK button; consequently, all of the protocols can be safely browsed and edited before deciding to save the settings.

With reference to the on-line help information and the table below, use the Detailed View 🖳 to manually configure the Network Settings:

TCP/IP Parameters	Description
BOOTP	Enable the BOOTP protocol for downloading the Internet address automatically. For further information on using BOOTP see also *Using BOOTP in UNIX,* on page 16. If you intend to use the AXIS IP Installer BOOTP must be enabled.
RARP	Enable the RARP protocol for downloading the Internet address automatically to the unit. For further information on using RARP, see also *Using BOOTP in UNIX,* on page 16.
IP Address	Specifies the unique 32-bit IP address of your unit.
Default Router	Defines the default router for the AXIS 2400/2401 which by default is set to automatic router search. If script applications the default router must be defined.
Subnet Mask	Defines the subnet mask for the AXIS 2400/2401. Used for determining when the traffic should be sent via a router. The default 0.0.0.0 indicates automatic router sensing. If script applications the subnet mask must be defined.
Bandwidth	Default to unlimited, this parameter defines the network bandwidth restriction for the video server; particularly useful for connection to busy and/or heavily loaded networks.

DNS Parameters	Description
Primary DNS	Defines the IP address of the primary DNS server. Used for identifying computers with names instead of IP addresses.
Secondary DNS	The IP address of the secondary DNS server. The secondary DNS server will be used in case the primary DNS server is unavailable or disconnected.

SMTP Parameters	Description
SMTP Mail Server	Defines the server that is to provide your e-mail facilities.
SMTP Return Address	The reply address for e-mails sent by the AXIS 2400/2401; that is, the name address that is to appear in the 'sent by' field of the dispatched e-mail.

Video Settings

Each Video icon within the graphic display represents a supported video input to the AXIS 2400/2401. An icon that is dull or opaque in color indicates the relative video source is not enabled; whereas, a cross **x** visible to the left of the icon suggests that the associated video signal is not present at the input.

Click the appropriate button to configure your video source, including:

- Video enabling and disabling
- Specifying the Pan Tilt Serial Port for the connected video camera
- Setting the image features as displaying text, clock, color or B&W etc
- Detecting the video modulation standard
- Editing PTZ (pan, tilt, zoom) preset positions

Image Settings

You click the Image Settings button to set the image features for the supported video source(s).

As the AXIS 2400 supports up to four video inputs, you can optionally choose to implement your preferred settings *generically* - that is, valid for all connected video sources, or *specifically* - limiting your settings to the video source previously selected in the graphic only.

From the Apply settings to drop-down dialog, you select whether your settings are to be applied *generically* or *specifically,* that is, Video 1's or All Videos.

With reference to the table below, configure the image settings to match your application demands:

General Parameter	Description
Display date & time on Image	Check to enable time display within the selected video source(s).
Display text on image	Enable or disable the display of a defined text string within the selected video image. Type the text string that you want to display within the Text field.
Miscellaneous Settings	
Color	Choose to display *Color* or *Black and White* video images.
Compression	Determines the compression factor for the selected video source: min, *low, medium, high or very high.* Minimum *(min)* compression optimizes picture quality, but generates larger image file sizes that demand greater network bandwidth.

Notes: • Image control can also be achieved directly using CGI parameters in the image URL.

• Using CGI parameters embedded in a URL request temporarily overrides any parameters defined within the Image Settings dialog.

• For further information on using CGI Parameters, see also *Appendix E - CGI Parameters.*

Input Modulation

Important!

The AXIS 2400/2401 supports today's two most popular video standards - NTSC and PAL: NTSC delivers 525 lines of resolution at 60 half-frames per second is the common standard in the United States; whereas, PAL delivers 625 lines at 50 half-frames per second and is the dominant video standard in Europe.

The AXIS 2400 supports NTSC, PAL and their derived standards; whereas the AXIS 2401 is supplied as either an *NTSC or PAL-specific unit.*

Automatic Detect-and-Store for the AXIS 2401

The AXIS 2401 is supplied as either a NTSC or PAL-specific unit; simply click the Video Input Modulation button from the Video Settings page to automatically detect and store an appropriate derivative-standard for your video input.

Automatic or Manual Selection for the AXIS 2400

The AXIS 2400 is fully compatible between both NTSC or PAL transmission protocols and supports several derivative modulation standards that are chosen either *Manually* or *Automatically*.

From the Video Settings page, you click the Video Input/Modulation button and select whether the settings are to be applied generically or specifically; that is, **Video 1's** or **All Videos**. Using either method described below, you then define the transmission standard for the unit:

Automatically - Simply click the **Start** button to initiate a search of the selected video source(s). An appropriate modulation type is then automatically assigned to the selected source(s).

Manually - Select a specific modulation type from the drop-down dialog box, as detailed below:

- PAL BGH/NTSC M:
- NTC 4.43, 50Hz / PAL 4.43, 60Hz
- PAL N/NTSC 4.43, 60Hz
- NTSC N/PAL M
- SECAM / PAL 4.43, 60Hz

Clicking Save registers your the settings with the Video Server.

Preset Positions

To enable quick and accurate camera PTZ positioning to known camera *hotspots*, the Administrator can control and record any camera *orientation* as a named entity - creating up to twenty Preset Positions that can be used at any time by the *Administrator(s)*, or *Users*.

Defining Preset Positions

The camera *orientation* for the selected video source is controlled by Pan Tilt and Zoom control bars. Follow the instructions below to define a preset position:

1. Click the Preset Position button. An image taken from the selected source - at its current position - is displayed in a new window.

2. Using the Pan Tilt and Zoom control bars, move the camera to the desired position.

3. Enter a descriptive name in the Current Position field.

4. Click Save to register the new preset position with the AXIS 2400/2401 and then check that the entered name is included in the Preset Positions drop-down list.

5. Click Remove only if you want to remove this or any other preset position in the list.

Established preset positions are reinstated from the Preset Positions drop-down dialog in the application viewing environment, or by the *user(s)* when viewing a specific video source.

Serial Port Settings

The AXIS 2400/2401 is supplied with two internal serial ports managed directly from the user interface:

*   Serial Port 1- typically used for controlling CCTV devices; such as, PTZ devices. This port can be logically connected to the RS232 COM 1 port or the RS485/422 port on the Terminal Block Connector; consequently, it is configurable as either an RS232 or RS485/422 port. Click the Port1 within the graphic interface to determine the Purpose, Interface Mode and Communication Settings for port.

*   Serial Port 2 - logically connected to the COM2; this port is also used for connecting Pan/tilt devices, but additionally provides a high-speed RS232 interface for connecting accessory equipment; such as, VCRs and badge readers to the AXIS 2400/2401.
    Click the Port 2 icon within the graphic interface to determine the Purpose and Communication Settings for the port.

Important!

Some pan tilt units are external devices; that are, standalone devices that connect to a fixed video camera without inherent pan-tilt-zoom support. Unless stated to the contrary, Pan Tilt devices are assumed to be in-built mechanisms within the video camera throughout this document.

Purpose

Both serial ports - Port 1 and Port 2 - can be designated as either of the following:

- Generic - the AXIS 2400/2401, through the Generic driver, has terminal server capabilities; consequently, third party applications can have complete control of the serial ports using TCP or HTTP. For more information see *Appendix D - The RS232 Interface* and *Appendix E - CGI Parameters.*

- Pan Tilt - from the drop down dialog choose from several Pan Tilt drivers supported as standard by the AXIS 2400/2401. A list of currently supported drivers is provided in *Supported Pan Tilt Drivers,* on page 48.

- None - if you are not connecting a Pan Tilt or Generic driver to the port.

Interface Mode

From the drop-down dialog you can configure COM1 as either an RS232 or RS485 port. Selecting the former logically connects Serial Port 1 to the COM 1 connector; whereas the latter connects the port to the Terminal Block Connector.

Notes:
- Most CCTV equipment supports the RS485 standard - that is a bi-directional, half duplex standard for transmitting data over multi-drop communications line. Supporting up to 32 drivers and 32 receivers over a single twisted pair cable, the maximum cable length should not exceed 4000 feet. Typically used for connecting a single PC to several addressable devices over the same cable.

- Many Video cameras support RS232 as it provides for a reliable point-to-point communications at low data transmission rates. Your wiring distances should be limited to one or two hundred feet for asynchronous data lines, and about 50 feet on synchronous lines.

Communications Settings

Using the drop-down dialogs for Baud Rate, Data Bits, Stop Bits and Parity; match the AXIS 2400/2401 data transmission formats with the devices connected to the COM1 and COM2 ports.

Note: The appropriate communications settings for each supported Pan/Tilt driver are defined in *Supported Pan Tilt Drivers,* on page 48. Check the user documentation supplied with your Pan Tilt device for detailed information.

Pan Tilt Settings

Before you begin:

- Ensure that your pan tilt devices are properly connected prior to proceeding with this section. Instructions for the physical connection of pan tilt devices are provided in *Appendix D - The RS232 Interface.*
- The Pan Tilt icon is displayed within the graphic interface only after the Purpose of the relative Serial Port has been set to Pan Tilt. If the Pan Tilt icon is not visible, or a Generic icon is displayed next to the relative serial port icon, refer to *Purpose,* on page 31 and redefine the purpose of the port.

Having defined the *purpose* as Pan Tilt, specified the related *Interface Mode* (COM1 only) and defined the *Communications Settings* for a serial port, you can then proceed to select an appropriate driver for connecting Pan Tilt devices.

Click the Pan Tilt icon within the graphic user interface to view and configure the General Pan Tilt settings, including:

- Defining the driver for your Pan Tilt device
- Viewing and editing the driver-specific settings
- Creating, editing and deleting preset camera positions

Choosing the Pan Tilt Driver

The AXIS 2400/2401 supports a variety of standalone Pan Tilt devices as standard.

You select an appropriate driver from the drop-down dialog, and click Save to register your choice with the AXIS 2400/2401. The driver configuration is then refined by clicking Driver Specific Settings.

Refining Driver Specific Settings

The comprehensive selection of embedded Pan Tilt drivers is listed in *Appendix D - The RS232 Interface.* For specific instructions on how to refine your installation by setting the respective Driver Specific Settings, see *Supported Pan Tilt Drivers,* on page 48.

Generic Driver Settings

Defining the *purpose* of the related serial port (COM1 or COM2) to Generic provides you with the option to position the video source directly using: HTTP (CGI parameters) in a Web browser, or a TCP client; such as, a Visual Basic application. Refer to *Appendix D - The RS232 Interface* for details.

Important!

The Generic icon ⬛ is displayed within the graphic interface <u>only</u> after the Purpose of the relative Serial Port has been set to Generic. Refer to *Purpose*, on page 31 and redefine the purpose if the Pan Tilt icon not visible, or a Pan Tilt icon is displayed next to the relative serial port icon.

Configuring using FTP

As an alternative to configuring the AXIS 2400/2401 using a Web browser, the configuration parameters of your unit can also be modified using the File Transfer Protocol (FTP).

FTP is supported by most operating environments and is useful method for quickly downloading standard preconfigurations to one or several remote video servers.

Modifying the Configuration File

Follow these instructions to modify the configuration file using FTP:

1. In a DOS or UNIX window, type `ftp videoserv`, where `videoserv` is the name or Host Name of your AXIS 2400/2401.

2. Login using the user root and the root password. Default password is `pass`. It is highly recommended that your change the root password, since all Axis products are shipped with this password as default.

3. Type `get config.ini` to access the configuration file.

4. Edit the config file using any text editor. In Windows 95/98 and Windows NT environments, you can for example use Notepad.

5. Once the editing is complete, save the file as *config.ini*. Type `put config.ini` to save the configuration file permanently.

6. To exit FTP, type the command `quit, bye`, or `exit`.

Tip!

To install similar settings on several units: simply make the correct settings for one unit, fetch via FTP the *config.ini* file, and then use a text editor to remove the IP address and any other unique settings. You can then download this file to all your units via FTP.

Using the Video Server

This section is specifically targeted at system *Users;* that is, personnel responsible for using the AXIS 2400/2401 as part of an integrated surveillance system.

Important!

- Your system *Administrator(s)* has installed the AXIS 2400/2401 to your computer network, connected several surveillance video cameras to the unit, and tailored the user functions and general look and feel of the system to specifically meet your surveillance needs; consequently, many of the functions and examples provided within the section can vary from those displayed in your system.

- Any deficiencies or shortcomings within your application should be escalated to the system *Administrator(s)* who has with high-level privileges normally denied to ordinary *users.*

- On-line help 🔳 may not be available from the user interface, as your access to this information may be denied by your system Administrator.

Accessing your Surveillance Images

The AXIS 2400/2401 can be used with most operating systems; including: Windows 95/98 and NT; as well as Linux, UNIX, Mac, and several others. You access the AXIS 2400/2401 from any standard Web browser; such as, Netscape Navigator 4.x or Internet Explorer 4.x (see the Important notice, below).

Follow the instructions below to access your surveillance images:

1. Start your Web browser application

2. Enter the name or IP address of the AXIS 2400/2401 into the Location/Address field (URL) of your Web browser:

Example

```
http://172.21.1.200/
```

A video image, similar to one of the examples featured on page 35, is now displayed within your Web browser.

Note: When accessing the AXIS 2400/2401 for the first time using Microsoft Internet Explorer, you must then temporarily lower your security settings to perform a one-time-only installation of Axis' ActiveX component onto your workstation, as described on page 17.

Typical Image Styles

Because the look and feel of the AXIS 2400/2401 user interface is set up by your *Administrator(s)*, the images format and page styles can vary considerably. Typical layout styles are featured below - but these examples should **not** be interpreted as an exhaustive library of available style formats.
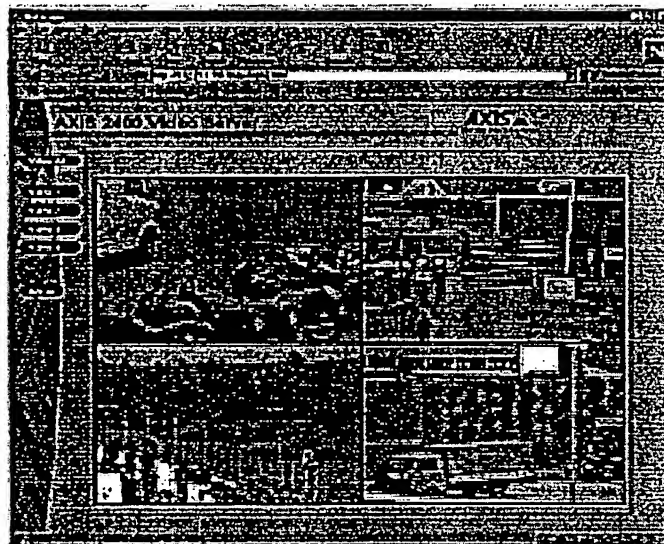
Typical Quad Image Style
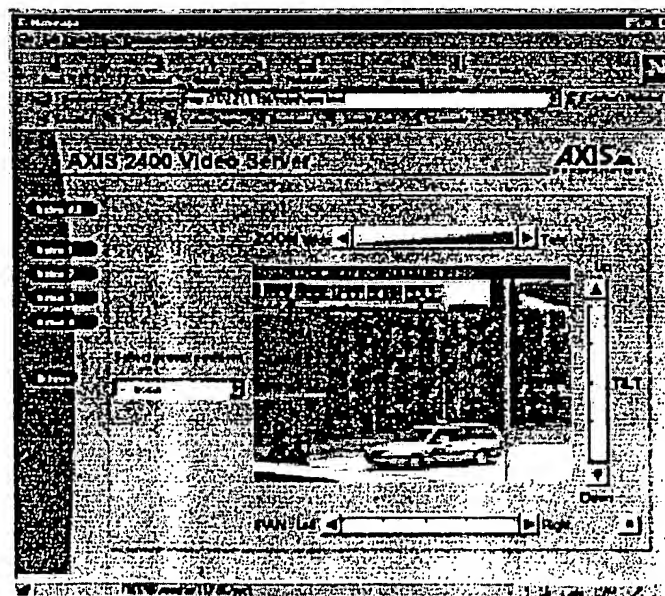
Typical Single Image Style

Disconnected Video Sources

All Disabled or Disconnected video cameras are displayed with an appropriate text message in single-display viewing areas; that is, when a source other than VIDEO ALL is specifically selected.

A blank display - without text, may indicate a break in the signal transmission; such incidents should be escalated to your system administrator immediately.

Positional Control of the Video Sources

Video cameras supporting Pan Tilt and Zoom (PTZ) control can be attached and positioned directly from the supported serial ports (COM 1 and COM 2).

Furthermore, the AXIS 2400/2401 can control up to two external (standalone) PTZ devices for positioning fixed cameras on your system.

All PTZ devices can be steered via the AXIS 2400/2401 Web interface, or TCP application if your Administrator chooses.

## Using the Pan Tilt and Zoom Toolbars

Clicking a specific Video button, other than Video All, automatically displays *pan-tilt-configured* video sources in a *single-image* format that features Pan, Tilt and Zoom bars, as shown below:

Select Preset Position

To enable quick and accurate camera positioning, the Administrator can define within server memory, up to 20 preset camera positions. Presets positions are established and saved as named entities by your Administrator and can be re-established at any time from the drop-down dialog.

Pan

Allows smooth or stepped horizontal panning of the camera. For details, refer to Camera Positioning (below).
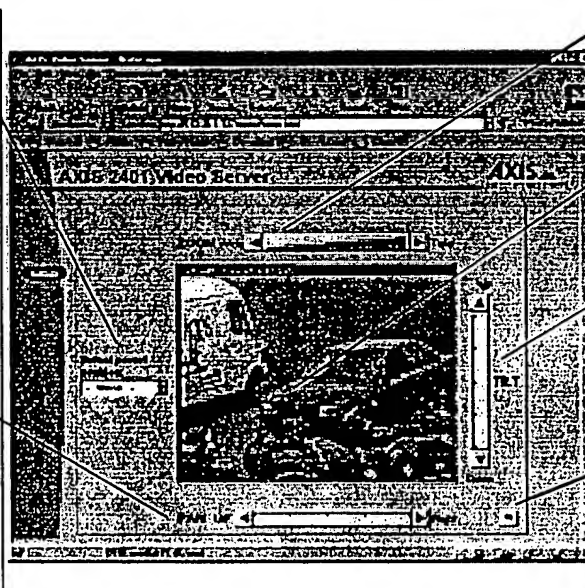
Zoom

Allows smooth or stepped camera zoom between telescopic and wide viewing.

Click-in-image

For navigational control of pan tilt devices

Tilt

Allows smooth or stepped vertical panning of the camera. For details, refer to Camera Positioning (below).

Home

Returns the camera to the default 'home' position. For details, refer to Camera Positioning (below).

Note: Pan Tilt control can be disabled by your Administrator and unavailable from the user interface.

Camera Positioning

Although very similar, the navigational functionality is slightly different for each of the available pan tilt drivers. The table below describes the basic positioning methods, and the level to which these are supported by the drivers available from the Administration pages:

Positioning method	Diamond Smartscan	Sony	Canon	Videmech	Ernitec	Pelco
Step: Click the left, right, up or down arrows within the positional toolbar to move the selected camera in 5° steps (approx) in the chosen direction.	Yes	Yes	Yes	Yes	Yes	Yes
Smooth: Each positional toolbar represents the full viewing angle for the selected camera. Click anywhere along the toolbar to gently travel the camera to its equidistant position.	Yes	Yes	Yes	Yes	No	No
Click in picture: Click directly in the picture to define the central position of the selected camera.	Yes	Yes	Yes	Yes	No	No
Home: Click to move the camera to its home position, as defined by the pan tilt device.	Yes	Yes	Yes	Yes	No	No

Camera Zoom

In a fashion similar to that provided for positional control, the degree of camera zoom is controlled by clicking a scaled toolbar that represents the full tele-zoom potential for the selected device.

Click the left or right arrows within the toolbar for *stepped* increases for *Wide* and *Tele* zoom respectively. Clicking anywhere along the toolbar gently adjusts the level of camera zoom by a *variable* value predetermined by the device.

Note: Variable zoom control is not supported by the Pelco and Ernitec drivers.

Assuming Preset Positions

To enable quick and accurate camera positioning to known camera *hotspots*, the *Administrator(s)* can create up to twenty Preset Positions that can be reinstated at any time by the *users*.

Choosing a preset position from the drop-down dialog immediately causes the selected camera to assume the predefined orientation.

Appendix A - Troubleshooting

This appendix provides useful information to help you to resolve any difficulty you might have with your AXIS 2400/2401. Fault symptoms, possible causes and remedial actions are provided within a quick reference table.

The Log File

The AXIS 2400/2401 log file records events within the unit and can prove a useful diagnostic tool when attempting to resolve any problems that might occur.

If you cannot resolve your problem after reading the information in this appendix or by referring to the AXIS 2400/2401 FAQ, you can escalate the problem to the AXIS support desk. To help us resolve your problems expediently, please ensure to provide the following information:

- A brief description of the problem
- The log file
- The config file
- If relevant, an example of a poor image

See "Support Services" on page 2 for information on how to contact your local support center.

Obtaining the File

Follow the instructions below to display all Video Server commands executed since the last *Restart* of the system:

1. Click the **Video Server** icon in the graphic interface.

2. Click the **View Log File** button. All Video Server commands executed since the last *Restart* of the system are displayed in a separate window.

Alternatively, obtain a copy of the log file, by typing the following command directly into the location/Address field (URL) of your Web browser:

```
http://<servername>/log/messages
```

Examining the File

The Log file can be examined directly using any text editor and typically contains the following information:

```
Wed Jun 30 19:13:10 Info: Initialize video decoders
Wed Jun 30 19:13:15 Info: Initialize serial ports and device Drivers
Wed Jun 30 19:13:15 Info: Create Canon VC-C3, COM1
Wed Jun 30 19:13:15 Info: Create HTTP Generic, COM2
Wed Jun 30 19:13:15 Info: Prepare for FTP/CRON image access
Wed Jun 30 19:13:15 Info: Initialize Juliette chip
Wed Jun 30 19:13:15 Info: Start script
Wed Jun 30 19:13:15 Info: Start SoftWatchdog
Wed Jun 30 19:13:15 Info: Create camera device port connection
```

Typical AXIS 2400/2401 Log File

PINGing Your IP Address

By sending a packet to the specified address and waiting for a reply, the *PING* (Packet Internet Groper) can determine whether a specific IP address is accessible; it also provides a particularly useful method for confirming addressing conflicts with your AXIS 2400/2401 on the network.

Having disconnected your AXIS 2400/2401, follow the instructions below in association with *Symptoms, Possible Causes and Remedial Actions,* on page 40, and run the PING utility to troubleshoot TCP/IP problems on your network:

1. Start a DOS window.

2. Type **ping** **x.x.x.x**, where *x.x.x.x* is the IP address of the AXIS 2400/2401.

3. The subsequent replies will provide an explanation as to the cause of the problem. Replies can be interpreted as defined in the table below:

PING Reply	Interpretation and recommendation
bytes = 32 time = 2 ms......	The IP address is already used and cannot be used again. You must obtain a new IP address.
destination host unreachable	The AXIS 2400/2401 is not accessible within your subnet. You must obtain a new IP address.
request timed out	This IP address is not used by anyone and is available for use with your AXIS 2400/2401.

Symptoms, Possible Causes and Remedial Actions

Symptoms	Possible causes	Remedial actions
The AXIS 2400/2401 cannot be accessed from a Web browser.	The IP address is already used by another device.	1. Disconnect your AXIS 2400/2401 from the network.
		2. Run the PING utility (as described in *PINGing Your IP Address*, on page 39) and follow the appropriate recommendations.
		Note: The assigned IP number can be assumed valid if the PING utility returns "request timed out" - in which case you should set the IP address again, power on the AXIS 2400/2401 and then try accessing the unit again.
	The IP address is located within a different subnet.	Run the PING utility (as described in *PINGing Your IP Address*, on page 39). If the utility returns "no response" or similar, the diagnosis is probably correct -you should then proceed as follows:
		In Windows 95/98 or Windows NT, check that the IP address for your AXIS 2400/2401 is within the same subnet as your workstation:
		1. Click "Start", "Settings", "Control Panel" and "Network".
		2. Specify the TCP/IP adapter and click on "Properties". In Properties, click "IP Address".
		3. Check that the first 3 numbers within the IP address of your AXIS 2400/2401 matches the first 3 of your workstation. If not, your AXIS 2400/2401 may be on a different subnet and the IP address cannot be set from this workstation. You must set the IP address for the AXIS 2400/2401 from a workstation on the same subnet.
	In Windows 95, the ARP table was empty when you tried to set the IP address.	In Windows 95, the ARP command cannot be used if you have an empty ARP table.
		Type arp -a to view the ARP table. If it is empty, you must ping an existing unit on your network before you can download the IP address to the AXIS 2400/2401, using ARP. See also the Important Note, on page 15. An alternative is to use the AXIS IP Installer.
	A programming script locking the unit.	Restore the unit to the factory default default settings. For details, refer to *Reinstating the Factory Default Settings*, on page 25.
The programming script is not working.	The programming script is disabled.	Check that the programming script has been enabled.
The Power indicator is not constantly lit	Faulty power supply.	Verify that you are using an Axis PS-D power supply.

Symptoms	Possible causes	Remedial actions
The Network indicator displays red.	Faulty cabling.	1. To verify that the cables are functional, PING the address of a known existing unit on your network. 2. If the cabling is OK and your network is reachable, you should receive the reply similar to this: `...bytes = 32 time = 2 ms,`
The Active and Network indicators are flashing every 0.5 seconds	Hardware failure.	Contact your Axis dealer.
Your AXIS 2400 works locally, but not externally.	Firewall protection	Check the Internet firewall with your system manager.
	Default routers required	Check if you need to configure the default router settings.
	The Internet site is too heavily loaded.	Use a script running on your web server to relay images from the AXIS 2400/2401 to the Internet.
No image using Refresh and/or Slow updating of snapshots using the Server push function.	Complex images, i.e. those containing great picture contrasts, have greater file size and thus place greater demand on the available file space within the AXIS 2400/2401.	The memory constraints become significantly more acute if multiple clients try to access the same snapshot. Try limiting the number of clients.
Triggering difficulties with programming scripts	Unable to triggering on both positive and negative transitions of the Control Button and/or IO ports (double-edged triggering).	Repetitive trigger conditions that occur in quick succession of one another can be missed. This is because the command initiated by the first trigger event may not have been fully executed prior to the second event. This scenario is demonstrated in the illustration below: This feature has particular significance when using commands that take a relatively long time to process, e.g. mail or ftp, especially if they are conjugated with a loop statement. See also *Appendix H- The Programming Script*.
Bad snapshot images.	Display configured incorrectly on your workstation.	Within Display Properties, configure your display to show at least 65'000 colors, i.e. at least 16-bit. Using only 16 or 256 colors on your computer will produce dithering artifacts in the image.

Note: If you still have a problem after reading this information, please contact your reseller or check the FAQ on the Axis Website at http://cctv.axis.com.

Appendix B - Updating the Software

The AXIS 2400/2401 server software is stored in Flash memory. This memory is provided by a silicon chip that just like any other ROM device, retains data content even after power is removed. Flash memory is unique because it allows its data to be erased and re-written. This means that you can install software updates for your AXIS 2400/2401 as soon as they become available - without having to replace any parts. New software can be simply loaded into the AXIS 2400/2401 over the network.

Obtaining Updated Software

The latest version of the AXIS 2400/2401 server software is available free of charge from Axis or your local distributor. You can obtain this software over the Internet or via anonymous FTP.

Over the Internet

From the http://cctv.axis.com/ link on the AXIS 2400/2401 Welcome Page, follow the "Support and Services" and then firmware links, or enter http://cctv.axis.com/service/fware.htm directly within the URL of your Web browser.

Click the Flash firmware and Release Note link to download the file axis2400.exe. This self extracting archive file unpacks the associated data and text files upon execution. It is recommended that you save this file in your root directory.

Anonymous FTP

Log in to ftp.axis.com and go to the /pub/axis/software/cam_srv/cam_2400/latest/ directory. Download the software download the file axis2400.exe. This self extracting archive file unpacks the associated data and text files upon execution. It is recommended that you save this file in your root directory.

Upgrading the Software

There are two methods for updating to the AXIS 2400/2401 Flash memory:

- over the network using the AXIS ThinWizard
- over the network using FTP

Upgrading Using the AXIS ThinWizard

AXIS ThinWizard is a tool for locating, managing and upgrading AXIS ThinServer devices, including AXIS 2400/2401 products. Supplied on the AXIS Online CD and Axis Website, it enables batch upgrading of several video servers simultaneously and is the recommended method for upgrading Axis products in TCP/IP networks.

Before you begin:

You must assign the AXIS 2400/2401 with an IP address, as described in *Assigning an IP Address*, on page 13, before you can use this upgrading method.

Follow the instructions below to upgrade your video servers using AXIS ThinWizard:

1. Click the Manage Network button in the AXIS ThinWizard main menu.

2. Select a network group from the drop-down list. You can only update the servers that are included in the selected network group.

3. All AXIS servers included in the network group appear. Click the Firmware button to start the Upgrade Wizard.

4. Follow the instructions that are presented to you to complete the installation.

For more information about AXIS ThinWizard, refer to the Axis Website at http://www.axis.com/

Upgrading using FTP

Having obtained the upgrade software, install it into the AXIS 2400/2401 by following the instructions below:

1. Reset the AXIS 2400/2401 by powering it off and then on again.

2. Start an FTP session and log in to the AXIS 2400/2401 as root, using the root password. By default this is set to pass.

3. Set FTP to binary mode using the command bin.

4. Download the new camera server software to you AXIS 2400/2401 by using the command put 2400_xxx.bin flash, where xxx is the version number for the firmware.
   This process takes 30 - 60 seconds. The LEDs will flash slowly during programming.

Note: If you need to force a download, e.g. when reverting to an older version of software, use the syntax put 2400_xxx.bin FLASH, where xxx is the version number for the firmware.

5. The AXIS 2400/2401 will report "Transfer complete, flash programming finished OK", once the programming is complete.

Caution!

In controlled environments, flash memory upgrades provide a very safe method for updating software. However, flash products can become damaged if the updating operation if not performed correctly.

Your dealer reserves the right to charge for repairs made necessary due to incorrect upgrading by the user.

Appendix C - Technical Specifications

System Requirements - The AXIS 2400/2401 uses the standard Internet TCP/IP suite of protocols and can be used with most operating systems: Windows 95, 98 and NT as well as Linux, UNIX, Mac and several others. The only software required is Microsoft Internet Explorer 4.x, or higher (used with Axis' ActiveX component AXIS Camera Control), or Netscape 4.x or above.

Installation - Physical network connection using RJ45 twisted pair cable. Installs directly to NTSC or PAL video cameras using BNC connectors. Use as a standalone system or as an add-on to existing CCTV systems.

Management - Remote configuration and status using Web-based tools.

Compression - Motion-JPEG, as well as single snapshot JPEG images. User controlled compression level.

Video Features - Time stamp and text overlay. Color control (B/W or color).

Video Inputs (AXIS 2400) - supports up to four BNC composite video inputs with 75ohm/Hi Z termination and includes autosensing for NTSC and PAL.

Video Inputs (AXIS 2401) - Supplied as an NTSC or PAL-specific unit allowing single BNC composite video connection with 75ohm/Hi Z termination.

Video Output (AXIS 2401) - A single video output (VIDEO OUT) terminated with a coax/BNC connector that allows direct connection of an external monitor.

Networking - 10baseT Ethernet or 100baseTX Fast Ethernet, TCP/IP, HTTP, FTP, SMTP, NTP, ARP, BOOTP.

General I/O - 4 optical-isolated alarm inputs and 1 output relay (max 24V, 0.1 A) supplied on a single terminal block connector. Programmable inputs for remote image storage via File Transfer Protocol (FTP) or E-mail (SMTP), pre/post alarm image storage.

Pre/Post Alarm Buffer - Up to 8 MByte memory available for pre/post alarm image storage.

Serial Connectors - 9 pin D-SUB RS-232 max 230 Kbps, 9 pin D-SUB RS-232 or RS-485/422 max 38.4 Kbps, half duplex

Pan/Tilt/Zoom - PTZ support for remote camera control. Currently supported units and protocols include: Ernitech ICU 51PA, Sony EVI-G20/21, EVI-D30/31, Canon VC-C3 and Diamond Smartscan. Future support for other PTZ units.

Security - User level password protection.

Operating Conditions: - Temp: 40-125×F (5-50×C), Humidity: 20-80% RHG.

Approvals - EMC: FCC Class A, C€ :EN 55022/1987,EN50082- 1/1992
Safety: EN 60950, UL, CSA.

Metrics: - Height: 1.7" (4.2 cm), Width: 5.7" (14.5 cm), Length: 8.7" (22.0 cm), Weight: 1.7 lb. (0.8 kg), excl. psu.

Hardware - ARTPEC-1 compression chip, ETRAX-100, 32 bit RISC, 100 MIPS CPU, 16 Mbyte RAM, 2 Mbytes FLASH PROM.

Power - 3 alternative power sources: External power supply 12V AC, 9.6 VA (PS-D, included), 9-20V AC, min 10VA, 6-30V DC, min 7W

Complimentary Software - AXIS IP Installer - for quick installation of multiple units, AXIS Thin Wizard - remote upgrade of multiple Axis units. AXIS Camera Control (Axis' ActiveX component software required for Microsoft Internet Explorer)

ThinServer Technology - Incorporating Axis ThinServer Technology, the AXIS 2400/2401 comprises: "thin" versions of the most popular network operating systems, Web management tools, Axis' own ETRAX 32-bit RISC processor - based on open architecture, streamlined and optimized for device connectivity independent of any file server, and the industry's first dedicated digital video surveillance compression chip - the AXIS ARTPEC-1.

Performance - The AXIS 2400/2401 delivers the following filesizes:

NTSC			PAL		
Resolution	**Filesize (kb)**	**Max fps***	**Resolution**	**Filesize (kb)**	**Max fps***
704 x 480**	7 - 150	10	704 x 576**	8.5 - 180	8
352 x 240	1.4 - 40	30	352 x 288	1.7 - 50	25
176 x 112	0.3 - 10	30	176 x 144	0.4 - 12	25
Quad (4 x 352 x 240)	7 - 150	5***	Quad (4 x 352 x 288)	8.5 - 180	5***

* Maximum performance given single user and only one video source in use.

** Interlaced image

*** Quad image, images from all four video sources integrated into one single image (AXIS 2400 only).

All specifications are subject to change without prior notice.

Appendix D - The RS232 Interface

As a complement to the information provided in *Pan Tilt Settings*, on page 32, this appendix discusses the functionality of the RS232 serial interface and provides detailed instructions on how to install a standalone Pan/Tilt device to the AXIS 2400/2401 Video Server.

Two 9 pin D-sub connectors provide the physical connection for the RS232 serial interface of the AXIS 2400/2401. These connectors are provided for connecting accessory equipment; typically standalone Pan/Tilt devices for remote positioning of connected video cameras.

The Physical Connector

A diagram of an RS232 connector and the AXIS 2400/2401 pin assignment table are detailed below.

Pin	COM1 Function	COM2 Function
1	NC	CD
2	RXD	RXD
3	TXD	TXD
4	RTS	DTR
5	GND	GND
6	DSR	DSR
7	RTS	RTS
8	NC	CTS
9	NC	RI
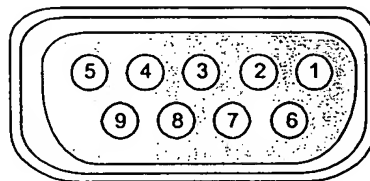
Notes: The pinout is different for each supported serial port

NC = Not connected

Camera Positioning

The AXIS 2400/2401 can control the position of connected cameras in three different ways:

- *Pan Tilt Control using the Web Administration Tools:* where, the position of the selected video camera is controlled using a standard Web browser.

- *Generic Control using CGI parameters:* enter the positioning data as a CGI command directly into your Web browser Location/Address (URL).

- *Generic control using a TCP client:* using a TCP client-application to control the position of the chosen camera.

Installing Pan/Tilt Devices

The diagram below illustrates how the AXIS 2400/2401 connects to your workstation, video cameras and relative Pan Tilt Device. ① A fixed camera can be positioned remotely by using an External Pan Tilt device. ② A PTZ-supported camera is connected directly to the COM 1 or COM 2 ports directly.
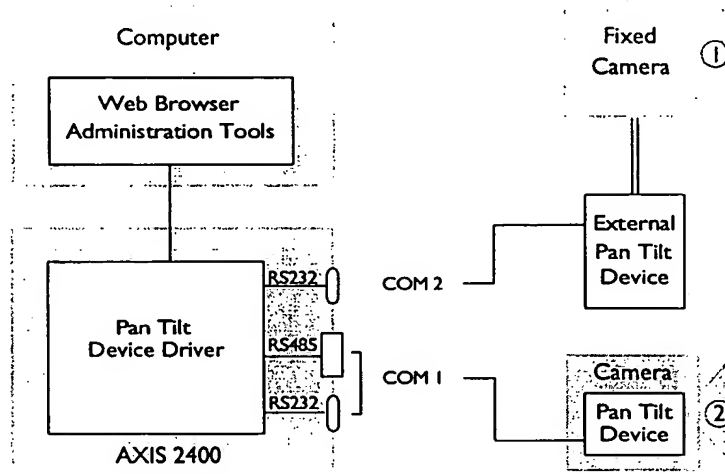
Follow the instructions below to install a Pan/Tilt device:

1. Attach the Pan/Tilt device to the Pan/Tilt port of the AXIS 2400/2401 using an RS232 cable.

Note: It is also possible to connect a Pan Tilt device via the RS485 port. See *Appendix F - The IO Terminal Block* for details.

2. On the AXIS 2400/2401 Home Page, click Settings. You will be prompted to supply a username and password. By default, these are set to root and pass.

3. Click Pan/Tilt.

4. Click Driver. Select the driver that corresponds to your Pan/Tilt device from the drop-down menu. Click Store driver.

Supported Pan Tilt Drivers

A comprehensive list of currently supported drivers with their associated settings is provided below:

| Driver	Serial Settings	Driver Specific Settings
Diamond Smartscan (SCAN III Family)	Baud = 9600 Parity = Even Databits =8 Stopbits=1	Define the unit identity, corresponding to the DIP switch settings for the connected device(1-255).
Canon VC C3 Accommodates single device connection only - per RS232 port.	Baud = 9600 Parity = None Databits=8 Stopbits=2	None.
Sony G20/G21/D30/D31 (VISCA) Accommodates up to three devices connected in daisy-chain.	Baud = 9600 Parity = None Databits =8 Stopbits=1	AXIS 2400 only: Define the unit identity, corresponding the order in which the device is connected in the daisy chain. Note: Sony devices normally support automatic sensing and chronological assignment of device identities for daisy-chain configurations.
Videmech (Universal Outstation Communication Protocol) Up to four devices connect to the RS485 connector in the terminal block.	Baud = 9600 Parity = Odd Databits=8 Stopbits=1	Define the following: • Serial Address: the address of the head connected to the camera corresponding to the DIP switch settings for the connected device(1-255). Note: the address 255 is reserved for broadcast, i.e all connected heads will receive commands sent to this address. • Movement limits: the limits representing the end positions in all directions, i.e left, right, up and down. These limits ensure that head travel is kept within certain bounds and must be used if there is any risk of obstruction in the device head movement. • Zoom and focus limits: indicating the end position for focus and zoom. In order not to stall the motors when approaching the mechanical end positions of your lens; it is very important that you limit the wide/tele intervals in accordance with the physical travel restrictions for the lens mechanism. • Zoom and focus enabled: uncheck these boxes if you not using a zoom and/or focus lens. • Optical Data: the MaxDeg setting should correspond to the optimal width of the viewing angle at max wide; the MinDeg setting should correspond to the minimal viewing angle at max tele.
Ernitec ERNA Up to four devices connect to the RS485 connector in the terminal block.	Baud = 2400 Parity = None Databits =8 Stopbits=1	Define the unit identity, corresponding to the DIP switch settings for the connected device(1-255).
Pelco Digital Coaxitron Up to four devices connect to the RS485 connector in the terminal block.	Baud = 2400 Parity = None Databits =8 Stopbits=1	Define the unit identity, corresponding to the DIP switch settings for the connected device(1-255).

Important!

Although many of the supported drivers have been tested and found to work satisfactorily with the AXIS 2400/2401, Axis cannot guarantee the compatibilty of all drivers, conforming or otherwise, to a specific manufacturer's protocol.

Notes: •Setting the Pan Tilt Address to 255 causes the control signals to be broadcast to all connected devices.

•Check the user documentation supplied with your Pan Tilt device for detailed information.

Generic Serial Port Control using HTTP

The AXIS 2400/2401 supports input/output operations on the serial ports via the HTTP protocol. The functionality can be used for adjusting the video camera position or for controlling a simple device, such as a relay switch. The schematic diagram below illustrates the logical elements for such a configuration:
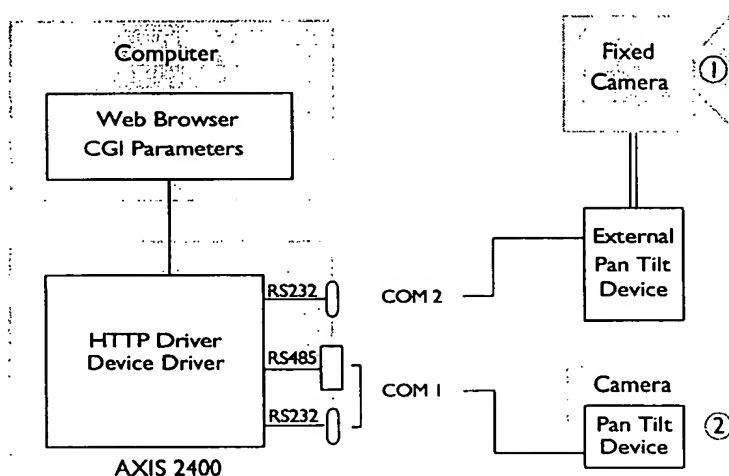

Follow the instructions below to configure serial port control for use with the HTTP protocol:

1. Click the Generic icon within the graphic user interface.

2. Set the HTTP radio button.

3. Click Save.

The Pan/Tilt port is now enabled for input/output operations via HTTP.

Serial Port Control using the TCP Protocol

The AXIS 2400/2401 supports input/output operations on the serial ports directly via the TCP protocol. The functionality can be used for adjusting the video camera position or for controlling a simple device, such as a relay switch. This functionality is normally used from a client application, developed for instance in Visual Basic. The schematic diagram below illustrates the logical elements for such a configuration:.
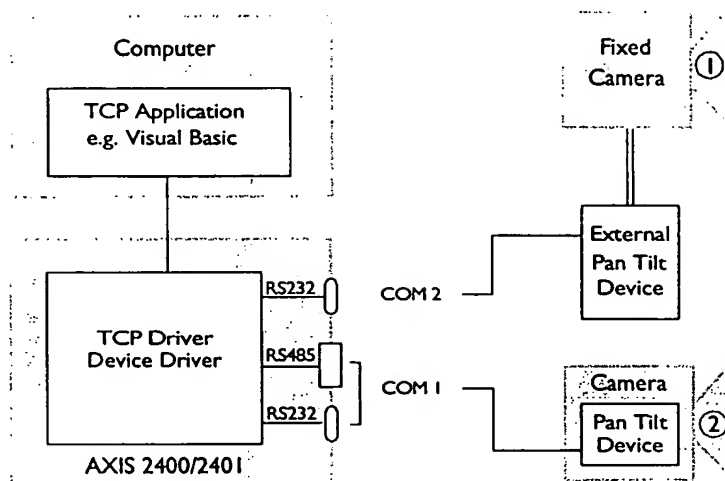
To enable TCP input/output operations on the Pan/Tilt port, follow these steps:

1. Click the Generic icon within the graphic user interface.

2. Set the TCP radio button.

3. Define the appropriate TCP Port number.

4. Click Save.

Note: Your TCP client application must also use this TCP port when communicating with the AXIS 2400/2401.

5. The Pan/Tilt port is now enabled for input/output operations via TCP.

Tip!

In step 3 (above), use a Telnet session to access the TCP port, and set a null modem connection to a terminal program; such as, Hyper Terminal to verify the setup of the generic TCP driver.

Appendix E - CGI Parameters

The Common Gateway Interface (CGI) is a standard for interfacing external applications with information servers, such as a Web server. A CGI program within the AXIS 2400/2401 allows you to define special video image features within an embedded URL request and generate simple HTTP input/output operations for controlling the Pan/Tilt port.

CGI parameter requests are generated in the form of query strings appended to the URL of the AXIS 2400/2401.

CGI Parameters for Image Requests

For snapshot requests, use this syntax:

```
http://<servername>/cgi-bin/<imagefile>?<parameter>=<value>[&<parameter>=<value>...]
```

This table lists the CGI parameters for snapshot requests:

Parameter/Syntax	Description	Values
camera=<n> (applicable for AXIS 2400 only)	Selects the source for generating snapshots. If omitted, the default camera is used.	1,2,3 or 4
compression=<value>	Adjusts the image quality and file size.	1-5, where: 1=minimum; 2=low, 3=medium; 4=high, 5=very high
color=<value>	Selects color or grayscale.	1 or 2; where: 1=grayscale; 2=color
clock=<value>	Shows/hides the time stamp.	on, off
motion=<n>	Shows motion JPEG image stream	0

Example 1

Request a fullsize JPEG snapshot from the default camera connected to the AXIS 2400/2401 videoserv that contains a clock reference:

```
http://videoserv/cgi-bin/fullsize.jpg?clock=on
```

Example 2

Request a highly compressed hugesize JPEG snapshot from the camera connected to VIDEO 2 on an AXIS 2400 with the DNS name videoserv:

```
http://videoserv/cgi-bin/hugesize.jpg?camera=1&compression=5
```

Example 3

The following example features a simple JavaScript that transmits live video images from a AXIS 2400/2401 into a Web page, using Netcape:

```
<html>
<head>
<title>Live Video Demo for Netscape</title>
</head>
<body>
<H2>Live Video Demo for Netscape</H2>
  <IMG SRC="http://172.21.1.200/cgi-bin/fullsize.jpg?camera=1&motion=0">
</body>
</html>
```

Example 4

The following example features a JavaScript that transmits live video images from a AXIS 2400/2401 into a Web page, using either Netcape or Microsoft Internet Explorer:

```
<html>
<head>
<title>Live Video Demo, Netscape and Microsoft Internet Explorer</title>
</head>
<body>
<H2>Live Video Demo, Netscape and Microsoft Internet Explorer</H2>
<SCRIPT LANGUAGE="JavaScript">
<!--//hide script
if ((navigator.appName ==
    "Microsoft Internet Explorer") &&
    (navigator.platform != "MacPPC") &&
    (navigator.platform != "Mac68k"))
{
  document.write("<OBJECT ID=\"CamImage\" WIDTH=352 ");
  document.write("HEIGHT=288 CLASSID=CLSID:917623D1-")
  document.write("D8E5-11D2-BE8B-00104B06BDE3 CODEBASE=");
  document.write("\"http://172.21.1.200/activex/ATLCamImage.ocx");
  document.write("#Version=1,0,1,18\"> <PARAM NAME=\"URL\" ");
  document.write("VALUE=\"http://172.21.1.200/cgi-bin/fullsize.jpg");
  document.write("?motion=10&camera=1\">");
  document.write("</OBJECT>");
}
else
{
  document.write("<IMG SRC=\"http://172.21.1.200");
  document.write("/cgi-bin/fullsize.jpg?camera=1&motion=0\"");
}
//end hide -->
</SCRIPT>
</body>
</html>
```

CGI Parameters for Pan Tilt and Zoom Control

Use the following syntax for creating CGI parameters to control Pan Tilt devices:

```
http://<servername>/cgi-bin/control?camera=<n>&<parameter>=<value>[&<parameter>=<value>...]
```

Example

Move the camera connected to VIDEO 1 on videoserv 45 degrees to the right:

```
http://videoserv/cgi-bin/control?camera=1&pan=45
```

This table lists the CGI parameters for Pan Tilt requests:

Parameter/Syntax	Description	Values
camera=<n>	Selects the source for pan tilt requests. This is mandatory and must be submitted (for the AXIS 2401 this is always set to 1).	1,2,3 or 4
move=<x>	Moves the Pan/Tilt device 5 degrees in the specified direction.	up/down/left/right/upleft/upright/ downleft/downright/*home/
*pan=<n>	Pans the Pan/Tilt device <n> degrees relative to the home position.	-180 ... 180
*tilt=<n>	Tilts the Pan/Tilt device <n> degrees relative to the home position.	-180 ... 180
*rpan=<n>	Pans the Pan/Tilt device <n> degrees relative to the current position.	-180 ... 180
*rtilt=<n>	Tilts the Pan/Tilt device <n> degrees relative to the current position.	-180 ... 180
*zoom=<n>	Adjusts the camera zoom to the specified angle.	1 ... 999 where 1 is full zoom out
zoomrel=<x>	Adjusts zoom to specified values.	wide/tel/*widemax/*telemax/
*focus=<x>	Adjusts zoom within the specified scale.	1 ... 999
*focusrel	Adjusts zoom to upper and lower extremes.	far or near
presetposno	Assumes the camera position defined by the preset position number.	1 ... 20
presetposname=<name>	Assumes the camera position defined by the preset position name.	<name>
*speed=<n>	Sets the head speed of the pan tilt device connected to the selected camera/port.	1 ... 999
whoami	identifies the type of pan tilt driver connected to the selected camera/port.	check

Notes: • Parameters and values identified with an asterisk "*" are not available to all supported pan tilt devices. For the latest driver-specific information, check out the Axis Camera Developer's Web at http://cctv.axis.com/

• The CGI parameters that adjust the camera position are only applicable when using one of the supported Pan/Tilt devices.

CGI Parameters for Preset Positions

For preset position requests, use this syntax:

```
http://<servername>/cgi-bin/control?presetposname=<position name>&camera=<n>
```

It is also possible to use an index number instead of the preset position name:

```
http://<servername>/cgi-bin/control?presetposno=<1-20>&camera=<n>
```

CGI Parameters for Serial Port Control

For HTTP input/output operations on the Pan/Tilt port requires the Generic driver to be selected. Use the following syntax:

```
http://<servername>/cgi-bin/control?<parameter>=<value>[&<parameter>=<value>...]
```

This table lists the CGI parameters for input/output operations

Parameter/Syntax	Description	Values
dataout=<string>	Writes a specified data string to the defined serial port (see port parameter, below). Maximum string length = 128 bytes.	Hexadecimal coded bytes {0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F, a, b, c, d, e, f}
port = <n>	Selects the serial port as either COM1 or COM2. This is mandatory and must be submitted.	1 or 2
read=<n>	Reads the specified number of bytes from the Pan/Tilt port. The returned value will be hexadecimal coded and placed between #'s, e.g. #3A#.	1 ... 128
wait=<n>	Waits the specified number of seconds before reading from the Pan/Tilt port. Used together with the "read" parameter.	1 ... 9
flush=<value>	Empties the input buffer for the Pan/Tilt port. Always performed first when combined with other parameters.	yes/no

Example 1

Writes the data stream 430001FF to COM1:

```
http://videoserv/cgi-bin/control?port=1&dataout=430001FF
```

Example 2

Clears the input buffer, writes the data string 2B004C4C4F to COM1 and waits 5 seconds for a reply. The AXIS 2400/2401 will return a value to the Web browser:
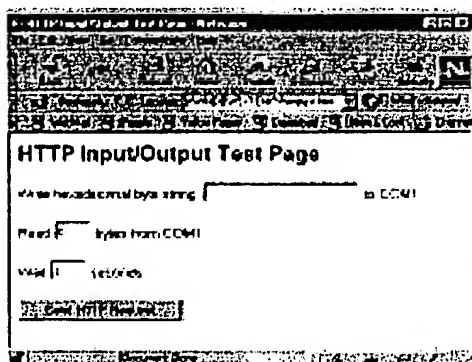
```
http://videoserv/cgi-bin/control?port=1&flush=yes&dataout=2B004C4C4F&wait=5&read=20
```

Example 3

An HTML page for reading and writing to the COM1 serial port:

```html
<html>
<head>
<title>HTTP Input/Output Test Page</title>
</head>
<body>
<h2>HTTP Input/Output Test Page</h2>
<form action="http://videoserv/cgi-bin/control" method=post>
Write hexadecimal byte string 
<input type=hidden name="port" value="1">
<input type=text size=20 maxsize=19 name="dataout"> to COM1
<p>Read <input type=text size=4 name="read" value="0"> bytes from COM1</p>
<p>Wait <input type=text size=4 name="wait" value="1"> seconds</p>
<input type=submit name="send" value="Send HTTP Request">
</form>
</body>
</html>
```

In a Web browser, the page will look like this:

Appendix F - The IO Terminal Block

Typically used in association with programming scripts for developing applications for motion detection, event triggering, time lapse recording, alarm notification via e-mail, picture storage to FTP locations and a variety of other functions; the 16-pin IO Terminal Block is located on the rear panel and provides the interface to: a single relay switch output, four digital photo-coupled inputs, an RS 485 interface, and auxiliary power.

This appendix describes the pinout, interface support and the control and monitoring functions provided by this connector.

Note: *Appendix H- The Programming Script* supplements the information provided within this section and is recommended reading for developers wanting to fully utilize the control and monitoring functions supported by this connector.
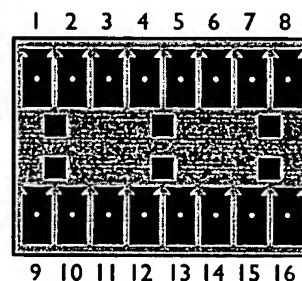

Connector Pinout

The pinout for the Terminal Block *(illustrated left)* and signaling details for each pin is fully described in the table below:

Pin	Function	Description
1	Auxiliary AC Power Input	Electrically connected in parallel with PS-D power connector, pins 1 &
2	Auxiliary AC Power Input	2 provide an auxiliary connector for mains power to the unit.
3	Digital Input 3 - Photocoupler Anode (+)	Photocoupled Input 3: Electrically isolated from the chassis and connectors, this input can be supplied from an external DC voltage or
4	Digital Input 3 - Photocoupler Cathode (-)	the DC Power Input/Output on pins 9 and 10.
5	Digital Input 4 - Photocoupler Anode (+)	Photocoupled Input 4. As above.
6	Digital Input 4 - Photocoupler Cathode (-)	
7	RS 485 - B (inverting)	Serial Port I- RS485. A half duplex RS485 interface for controlling
8	RS 485 - A (non-inverting)	auxiliary equipment. Note: Serial Port I is programmed as either RS232 (COM I Connector) or RS485 (Terminal Block Connector), via the Web browser interface.
9	DC + Power (Input or Output)	DC Power Input or Output: Used as an input, it supplies the Axis
10	DC - Power (Input or Output)	2400 via a DC source; for example. a solar panel or a battery. As an output, it can drive the photo coupler inputs or other equipment; such as an IR-sensor. The output voltage level is dependent upon the input voltage to the unit. A maximum current of 50mA can be sourced from the DC output. Pin 10 is connected to unit chassis, and Ground on each serial port and video input. See circuit diagram (below).
11	Digital Input 1 - Photocoupler Anode (+)	Input 1 Photo coupler input. As Input 3.
12	Digital Input 1 - Photocoupler Cathode (-)	
13	Digital Input 2 - Photocoupler Anode (+)	Input 2 Photo coupler input. As Input 3.
14	Digital Input 2 - Photocoupler Cathode (-)	
15	Relay Switch	Relay switch - electrically isolated from chassis and connectors.
16	Relay Switch	

Note: For compatible replacement connectors, contact http://www.phoenixcontact.com, quoting:
MC1.5/8-ST-3.81 (art no 1803633)

Power and Ground
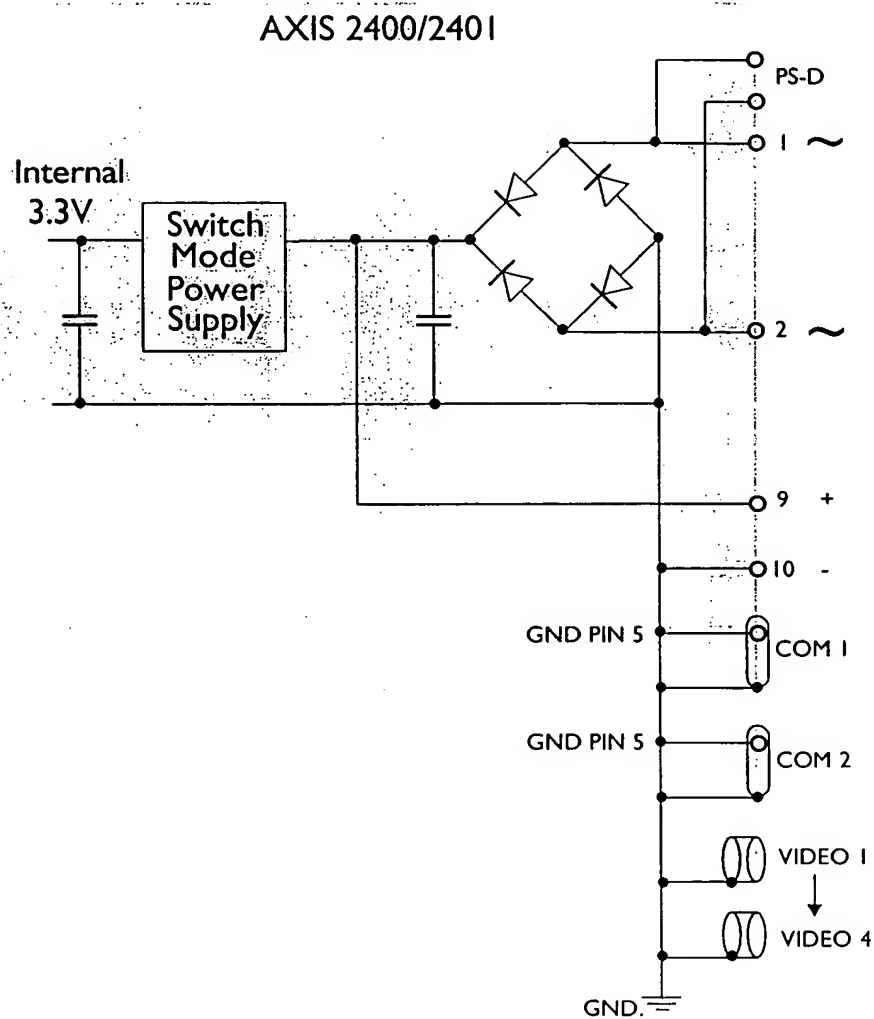
AXIS 2400/2401

Controlling and Monitoring

The status of the input/output interface can be controlled and monitored by the IO software file resident within your AXIS 2400/2401.

From your Web browser, you can access the IO control file to:

• query the relay status, or drive the relay output high or low

• monitor the status of the 4 digital inputs

Note: To access the control file requires `root` access, you will therefore need to supply a username and password. Login as `root` and supply the root password (default = `pass`).

Relay Output

You can use the supported relay output to drive directly a maximum load of 24V AC/DC at 100mA. By connecting additional relay circuitry, it can also drive heavier loads.

Querying the Status of the Relay

Enter the following URL to query the status of the relay output:

```
http://<servername>/io?relay=check
```

The AXIS 2400/2401 displays the relay status as either:

```
relay=on or
relay=off
```

Setting the Relay

The relay can be controlled from the scripting language using the relay command, as described in *relay*, on page 75, or by entering the following URL:

```
http://<servername>/io?relay=on or
http://<servername>/io?relay=off
```
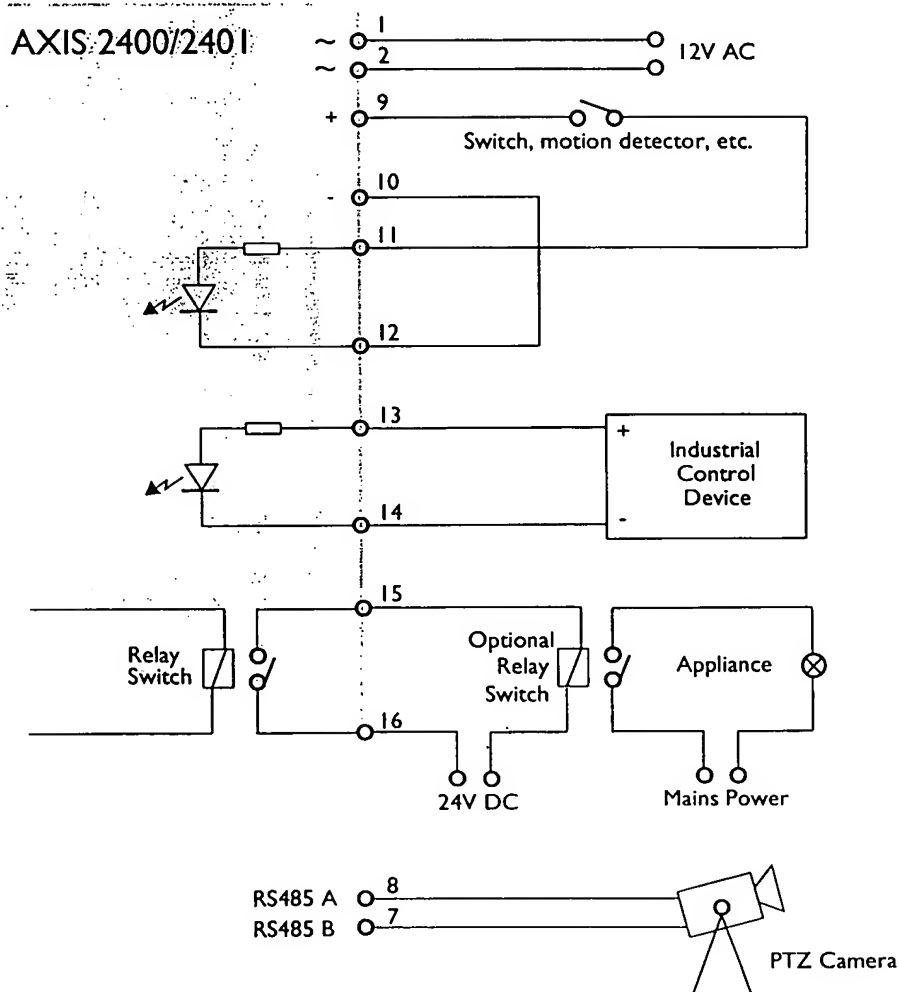
The AXIS 2400/2401 returns a respective messages, to confirm the relay status:

```
Relay is off
Relay is on
```

Digital Inputs

The four digital inputs make it possible to trigger your snapshots on chosen events using a programming script. By connecting a motion detector to a digital input for example, it is possible to trigger picture storage for each occasion that the detector is activated.

For full programming information, please refer to *Appendix H- The Programming Script.*

AXIS 2400/2401

~ 1
~ 2   12V AC

+ 9
                    Switch, motion detector, etc.

- 10
  11
  12

  13   + Industrial Control Device -
  14

  15
Relay Switch   Optional Relay Switch   Appliance
  16
        24V DC   Mains Power

RS485 A 8
RS485 B 7   PTZ Camera

Schematic diagram of the AXIS 2400/2401 Auxiliary Connector
- displaying a possible application

Querying the Status of Digital Inputs

The status of the four supported digital inputs can be queried in exactly the same fashion as the relay output. Simply enter the following URL to query the status of the digital inputs:

```
http://<servername>/io?relay=check
```

The AXIS 2400/2401 displays the relay status as either:

```
Input1 is on / off
Input2 is on / off
Input3 is on / off
Input4 is on / off
```

Appendix G - Camera Applications

The AXIS 2400/2401 offers live video over the network for enhancing and modernizing traditional CCTV and video surveillance systems... and much more.

Whereas traditional security systems often limit camera access to a specific monitor; the AXIS 2400/2401 allows industrial and security surveillance over a secure intranet network and even allows you to broadcast live images over the Internet. You can now monitor operations remotely from within the comfort of your own home, corporate headquarters; or indeed, from any workstation of your choosing that supports a Web browser. Just think... no more late trips to the factory to investigate problems!

This section provides a detailed description of each preconfigured application available within the Layout and Configuration Wizard and several client application ideas that will be of interest to Administrators developing their own applications.

Wizard Preconfigurations

There are currently two Layout and Preprogramming applications available. The Application Wizard guides you through the configuration procedure and helps you to define the functionality of your application and general look-and-feel of the user interface. You initially choose from Surveillance System or Web Attraction preconfigurations and then refine the application specifically to your needs by selecting from several of the available features in the Wizard.

Surveillance System - Provides a typical surveillance design; including: Quad system with or without pre/post alarm storage, Pan Tilt Zoom control and preset, variable picture size and magnification parameters. Aesthetic aspects of system presentation; such as, background, logo, user button and product title presentation, are also configurable.

Web Attraction - A basic system design that delivers a standard picture system - without the alarm and control features provided by of the former. Aesthetic aspects of system presentation; such as, background, logo, user button and product title presentation, are configurable.

Client Applications

Aside from the preconfigured applications included as standard in the AXIS 2400/2401; there are a whole host of other exciting applications that have already been developed, tested and implemented by other developers using Axis' camera products.

Typical applications include: security surveillance in banks, parking lots and conference rooms, industrial surveillance, visual security systems, medical applications, intruder alarm verification, traffic surveillance, image archiving, integrating video images into personal Web application using CGI scripts, fun applications etc. SMTP e-mail support means that you can even send images as e-mail attachments at predetermined times or events.

Notes: • Take the time to look at what other organizations in the industry are doing with Axis' network cameras. Visit Axis' dedicated CCTV Website at: http://cctv.axis.com

• Network Camera Servers Developer's Pages: The Camera Division at Axis maintain a specialist site for network camera developers. New exciting application ideas, tools, and pre-programming scripts are constantly being added - this is an invaluable reference site for Axis' development partners and OEMs. Follow the camera links and check it out at: http://cctv.axis.com/

Appendix H- The Programming Script

Administrators and developers wishing to create a special level of customization within their applications can create their own programming scripts using the Programming Script Editor.

Using the programming scripts demonstrated in this appendix, you can quickly develop applications for: motion detection, event triggering, alarm notification via e-mail, picture storage to FTP locations and a whole host of other functions limited only by your imagination.

The programming syntax and option information is supported by practical examples presented within the context of genuine scripts that have been developed, tested and implemented into proper user applications.

Note: Network Camera Servers Developer's Pages: The Camera Division at Axis maintain a specialist site for network camera developers. New exciting application ideas, tools, and programming scripts are constantly being added to provide an invaluable reference site for Axis' development partners and OEMs. Follow the camera links and check it out at: http://cctv.axis.com/

Starting and Enabling the Editor

1. Click the **Programming Script Editor** button to start the editor.

2. Enter a your script in the main window and then click the Save button to deposit the script in product memory.

3. Check the **Enable** box to activate the programming scripts in your system.

Notes: •Scripts can be saved but are not activated until the Enabled button is checked.

•Saving new scripts automatically removes any existing script previously saved with the Editor.

•A previously saved script is automatically displayed when the Programming Script Editor is opened.

Programming Script Format

A programming script for the AXIS 2400/2401 includes one or several entries and is entered into the editor in the following format:

```
# <comments>
<triggering condition> :
<commands>;
%
```

where:

* The <comments> are optional.
* The <trigger condition> includes the following fields: <minute> <hour> <day> <month> <weekday> <optional input/boot event>
* The <commands> include one or several programming script commands.

Comments

It is good programming practice to start each new entry with a comment to describe its function. Comments are optional but must be proceeded by a # character, as detailed below:

```
# <comment>
```

Example:

```
# This programming entry will...
```

Trigger Condition

The commands contained within each specific entry are triggered by a defined trigger condition. The trigger condition is specified by six separate fields and must be terminated with a colon ":".

```
<Minute> <Hour> <Day> <Month> <Day of the week> <Input and Boot Field (optional)> :
```

Time and Date Event Fields

The first five fields specify the time and date events, i.e. Minute, Hour, Day, Month and Day of the week.

The syntax for each field within a trigger condition is governed by the following rules:

* Each time and date field can contain several numerical event variables that are delimited by commas and hyphens.
* Each field is delimited by an open space.
* An asterisk (*) represents the full range of event variables within the relative time and date field, i.e. * * * * * means every minute, every hour, every day, every month, every day of the week.
* Numerical event variables separated by a hyphen indicate an inclusive range; for example, 2-6 means 2 to 6.

Example:

Trigger every month, between the fourth and eighth at 10.03, 12.03 and 14.03, using the 24-hour clock:

```
3 10,12,14 4-8 * * :
```

Input and Boot Field

The sixth field is an optional Input and Boot field that defines the input and boot trigger functions.

Using the trigger variables boot, B, I1 and I2 respectively, you can program the AXIS 2400/2401 to trigger at startup or on the logical states present on the Control button and digital input ports. The B, I1 and I2 trigger variables must be proceeded by an activate condition, /, \, 0 or 1, to indicate when the trigger variable is activated.

Note: The AXIS 2400/2401 has four digital input ports 1 - 4 interfaced via the Terminal Block Connector. For connection details please refer to *Appendix F - The IO Terminal Block*.

The table below outlines the available trigger variables and their possible combinations:

Trigger Variable	Description
BOOT	Activate at startup.
START	Activate at startup, and when a new script is compiled
\V	Activate when one enabled video signal is lost
/V	Activate when all enabled video signals are back
\B	Activate after high-low logical transition of Control button.
/B	Activate after low-high logical transition of Control button.
1B	Activate when Control button is logically high (pressed).
0B	Activate when Control button is logically low (released).
\I1	Activate after high-low logical transition on Input Port 1.
/I2	Activate after low-high logical transition on Input Port 2.
1I1	Activate when Input Port 1 is logically high.
0I2	Activate when Input Port 2 is logically low.
... etc.	

Note: The video server polls the input ports every 0.2 seconds. Thus, more rapid logical transitions will not be detected.

Complex triggering mechanisms can be developed by simply conjugating the trigger variables using a logical AND function (&), as shown below.

Example 1

Activate on Control button transition from high to low and Input port 1 high.

```
\B&1I1
```

Example 2

Activate on Input port 1 low and Input port 2 transition from low to high.

```
0I1&/I2
```

Commands

A comprehensive catalog of available programming commands, complete with their syntax and valid options are described below:

alert

The alert command sends a message to a remote host.

Syntax

```
alert [-host HOST] [-port PORTNUMBER] [-message STRING];
```

Options

-host Specifies the host name or IP address of the remote host.

-port Specifies the TCP port number in the range [0..65534].

-message
Specifies the message that will be sent to the remote host. The message must be surrounded by quotation marks. Hexadecimal coded messages must be preceded by \0x, e.g. "\0x04" for the non-printed character EOT. To include a quotation mark, it must be preceded by a backslash, e.g. \".

Example

```
# This command will send the message "Alarm
# "0013" from AXIS 2400" to the remote host when
# input port 1 goes high.
* * * * /I1:
alert -host 172.21.1.202 -port 2703 -message "Alarm \"0013\" from AXIS 2400":
%
```

buffer_init

The buffer_init command initiates or clears the image buffers. This is needed in order to store images using the buffer_start and buffer_stop commands.

Syntax

```
buffer_init [[CAMERANUMBER],[IMAGE],[SIZE][:[CAMERANUMBER],[IMAGE],[SIZE]]];
```

Options

CAMERANUMBER
Specifies the camera source, i.e. 1- 4 (AXIS 2401must be set to 1)

IMAGE
Specifies the image type 1- 3, where: 1=halfsize.jpg, 2=fullsize.jpg and 3=hugesize.jpg

SIZE

Specifies the maximum number of images that can be stored in the buffer. The valid range is 0-65535, although in practice is limited by the amount of available memory within the AXIS 2400/2401.

To initiate several buffers, you can stack multiple statements separated by colon.

Notes: • To clear the image buffer, you simply do not specify any arguments.

• To initiate several buffers, you can stack multiple statements. Each statement must separated by a colon ":".

Example 1

```
# At startup, this command will initiate one
# buffer for camera 1 with 25 fullsize.jpg images
# and one buffer for camera 2 with 5 hugesize.jpg
# images.
* * * * * BOOT:
buffer_init 1,2,25:2,3,5;
%
```

Example 2

```
# This command will clear the buffer every Sunday.
0 0 * * 0 * :
buffer_init;
%
```

buffer_start

The buffer_start command stores snapshots in a specific image buffer. Before the command can be used, the buffer facility must be initiated using the buffer_init command.

When invoked, the buffer_start command is executed in the background and any subsequent command in the event entry is executed immediately.

Images are retrieved using the ftp or mail command (refer to page 70 and page 73 respectively).

Syntax

```
buffer_start [-src SOURCEFILE]  [-cam CAMERANUMBER]
[-interval TIME] [-duration TIME]  [-store SIZE];
```

Options

-src   Specifies the source file name, i.e. halfsize.jpg, fullsize.jpg or hugesize.jpg.

-cam   Specifies the camera source, i.e. 1-4. If omitted, the default camera will be used (AXIS 2401 must be set to 1)

`-interval`

> Specifies the time interval between consecutive snapshots. If omitted, new snapshots are generated without any delay.
>
> Format: `h<hours>m<minutes>s<seconds>`, or `fps <approximate frames per second>`.

`-duration`

> Specifies the total time for the command to run. If omitted, the buffer_start command will be issued only once.
>
> Format: `h<hours>m<minutes>s<seconds>`.
>
> If you specify `-duration inf`, the command will continue to be executed until it is interrupted by any of the commands: `buffer_init`, `buffer_start` or `buffer_stop`.

`-store`

> Specifies the number of images to be stored in the buffer. This setting will override the duration. The maximum number of images is specified by the buffer_init command.

Example

```
# This command will keep loading fullsize.jpg images.
******:
buffer_start -src fullsize.jpg -cam 3 -interval s30
-duration inf;
%
```

buffer_stop

The buffer_stop command terminates the storage of snapshots to an image buffer. Until completed, the buffer_stop command will block the execution of any subsequent commands in the event entry. Note that the **buffer_start** command behaves differently.

The command is typically used together with the **buffer_start** command.

Syntax

```
buffer_stop [-src SOURCEFILE] [-cam CAMERANUMBER]
[-interval TIME] [-duration TIME] [-store SIZE];
```

Options

`-src` Specifies the source file name, i.e. `halfsize.jpg`, `fullsize.jpg` or `hugesize.jpg`.

`-cam` Specifies the camera source, i.e. 1- 4. If omitted, the default camera will be used.

`-interval`

> Specifies the time interval between consecutive snapshots. If omitted, new snapshots will be generated without any delay.
>
> Format: `h<hours>m<minutes>s<seconds>`, or `fps <approximate frames per second>`.

`-duration`

> Specifies the total time for the command to run. If omitted, the buffer_start command will be issued only once.
>
> Format: h<hours>m<minutes>s<seconds>.
>
> Note that if you specify -duration inf, the command will continue to be executed until it is interrupted by a buffer_init command.

`-store`

> Specifies the number of images to be stored in the buffer. This setting will override the duration. The maximum number of images is specified by the buffer_init command.

Example

```
# This command initiates the buffer to hold 60
# halfsize.jpg and 5 hugesize.jpg images. New images
# are captured until the buffer_start command is
# interrupted.
* * * * * BOOT :
buffer_init 1,1,60:1,3,5;
buffer_start -src halfsize.jpg -interval s1 -duration inf;
buffer_start -src hugesize.jpg -interval m1 -duration inf;
%
# When port 1 is triggered, an alert message is sent
# to host 1.2.3.4. Another 10 halfsize.jpg images are
# captured and all the images are sent to an ftp
# server with the names "Halfsize_1" to
# "Halfsize_60". Then the buffer is restarted.
* * * * * /I1:
alert -host 1.2.3.4 -port 4000 -message "Alert! Input on port 1.";
buffer_stop -src halfsize.jpg -store 10;
ftp -host somehost -user USER -pass PASS -src images/buffer.jpg -dest
Halfsize_$r1-60 -time
h1 -buffer halfsize.jpg;
alert -host 1.2.3.4 -port 4000 -message "Alert! Images sent to ftp server";
%
# When port 2 is triggered, the 5 most recent
# hugesize.jpg images are sent to an ftp server
# with the names "Picture_1" to "Picture5". Note that
# the buffer is not stopped.
* * * * * /I2:
ftp -host somehost -user USER -pass PASS -src images/buffer.jpg -dest
Picture_$r1-5 -time h1
-buffer hugesize.jpg;
%
```

ftp

The ftp command uses the standard File Transfer Protocol (FTP) for transferring an image from your AXIS 2400/2401 to a remote host.

Note: The ftp command keeps the connection open during each file transfer.

Syntax

```
ftp    [-host HOST] [-user USERNAME] [-pass PASSWORD]
[-src SOURCEFILE] [-dest DESTINATIONFILE]
[-temp TEMPORARY_DESTINATION_NAME] [-loop LOOPTIME]
[-time TOTALTIME] [-cam CAMERANUMBER]
[-buffer BUFFERTYPE];
```

Options

-host Specifies the name or IP address of the remote host. If specifying the DNS name, performance will be slightly decreased due to the DNS lookup. If no host is specified, the compiler will complain.

-user Specifies the user name for logging on to the remote host. If no user name is specified, the compiler will complain.

-pass Specifies the password for logging on to the remote host.

-src   Specifies the source file name. If omitted, the fullsize.jpg file will be sent. To include the image buffer, specify images/buffer.jpg.

-dest Specifies the name and whole path of the destination file. If omitted, the destination file name will be the same as the source file name. The maximum length of a destination file name is 255 characters. You can add as many destination files as required, separated by a space.

You can add time stamps, such as time, date and file indexes, to the destination file name. This is useful for example when you are transferring a series of files.

The following table lists the available time stamp variables. Every substitution must be proceeded by a dollar sign "$".

$s
The current second in the range 00-59.

$m
The current minute in the range 00-59.

$h
The current hour in the range 00-23.

$d
The current day of the month in the range 01-31.

$n
The current month in the range 01-12.

$y
The current year without the century in the range 00-99.

$Y
The current year including the century.

$rS-E
Inserts an index number starting from number S through all the numbers including the number E. If you leave out number E, it will be interpreted as a very large number. Note: The rS-E substitution can be used with the first destination file only.

-temp   Specifies a temporary name for the destination. This is to prevent someone else from accidentally reading the file during the download.

-loop   Specifies the time interval within which the command should be repeated and used together with the time attribute. If omitted, there will be no delay between repeated transfers. Format: h<hours>m<minutes>s<seconds>, or fps <approximate frames per second>. Optional.

-time   Specifies the total time the command should loop. Used together with the loop attribute. If omitted, the ftp command will be issued only once. Format: h<hours>m<minutes>s<seconds>. Optional.

-cam   Specifies the camera source, i.e. 1 - 4. If this is omitted, video camera source 1 is used as default.

-buffer
Specifies the buffer type, e.g. fullsize.jpg, halfsize.jpg or hugesize.jpg. Only valid if -src is set to images/buffer.jpg.

Additional Options

In addition to the options described above, the following optional settings are also available:

-ctrlport
Specifies the TCP port number in the range [0..65534] to be used as the control port for the FTP server.

-dataport
Specifies the TCP port number in the range [0..65534] to be used as data port for the FTP server.

-to   Specifies the timeout, i.e. the FTP session will terminate when the specified time limit has expired. Format: h<hours>m<minutes>s<seconds>.

Example 1

```
# This command will log in as "user" with the
# password "pass" on the host with the Internet
# address 123.123.123.123, download a hugesize
# image with the name "user.jpg" and put
# it in the directory "/home/user" on the remote
# host. During download, the file name "tmp.jpg"
# will be used.
* * * * * * :
ftp -host 123.123.123.123 -user user -pass pass
-src hugesize.jpg -dest /home/user/user.jpg -temp
tmp.jpg;
%
```

Example 2

```
# This command will every hour, every five seconds
# for twenty minutes, download a fullsize image
# from camera 3 and save the images with a time
# stamp in the filename.
0 * * * * * :
ftp -host an.interesting.site -user user -pass pass -src fullsize.jpg
-dest tmp/full$h$m$s.jpg -loop s5 -time m20 -cam 3;
%
```

Example 3

```
# This command will send 1001 consecutive fullsize
# images to "your.host.name". The first and last
# images will be named "fullsize1000.jpg" and
# "fullsize2000.jpg", respectively.
* * * * * * :
ftp -host your.host.name -user user -pass pass
-src fullsize.jpg -dest
/home/camera1/tmp/fullsize$r1000-2000.jpg;
%
```

log

This command writes a message to the AXIS 2400/2401 log file.

Note: To display the log file, you type the following in the address/location field of your Web browser:
http://<video server>/log/messages

Syntax

log [MESSAGE];

Options

[MESSAGE]

The message string must be surrounded by quotation marks.

Example:

```
# This command writes a message to the log file when the AXIS 2400/2401 Control Button is pressed.
* * * * * /B :
log "The Control button was pressed." ;
%
```

mail

This command uses the Simple Mail Transfer Protocol (SMTP) for sending images and files from your AXIS 2400/2401 to e-mail addresses.

Note: The IP address of the mail server and a valid return address on the TCP/IP page must be specified when using the mail command.

Syntax

mail [-s SUBJECT] [-a ATTACHMENTS] [-t RECIPIENTS]
[-cam CAMERANUMBER] [-b BUFFERTYPE] [-n NUMBER];

Options

-s   Specifies the subject text for the e-mail. A simple one-word subject does not require quotation marks. A subject with multiple words must be surrounded by quotation marks.

-a   Specifies attachments such as images or files.To include the image buffer, specify: images/buffer.jpg.

-t   Specifies the e-mail address of the recipient(s).

-cam   Specifies the camera source, i.e. 1-4. If omitted, the default camera will be used (AXIS 2401 must be set to 1).

-b   Specifies the buffer type, i.e. fullsize.jpg, halfsize.jpg or hugesize.jpg. Only valid if -a is set to: images/buffer.jpg.

-n   Specifies the number of buffered images to be included in the e-mail. Only valid if -src is set
        to images/buffer.jpg.

Example 1

```
# This command will send an e-mail with the
# subject "Hello" and the attached file
# fullsize.jpg to someone@company.com
* * * * * * :
mail -s Hello -a fullsize.jpg -t someone@company.com;
%
```

Example 2

```
# This command will send an e-mail with the
# subject "This "fullsize.jpg" was sent from my
# AXIS 2400" to two recipients.
* * * * * * :
mail -s "This \"fullsize.jpg\" was sent from my AXIS 2400" -a fullsize.jpg -t
someone@axis.com anotherone@axis.com;
%
```

Example 3

```
# This command will send an e-mail with two attachments.
* * * * * * :
mail -a fullsize.jpg halfsize.jpg -t me@home;
%
```

ptz

This command pans, tilts and zooms connected video cameras.

Syntax

```
ptz [-speed VALUE[DEVICE]] [-preset POSITION]
[-cam CAMERANUMBER] [-zoom VALUE] [-move DIRECTION]
[-pan ANGLE] [-tilt ANGLE];
```

Options

-speed

        Supported by Canon and Sony drivers only, this parameter defines within the range 1 - 999,
        the speed with which the camera source moves between the defined positions; where: 1 is
        slow and 999 is fast.

-preset
> Specifies the preset position, i.e. 1- 20. Note that camera source must be defined within the command.

-cam Specifies the camera source, i.e. 1 - 4. If this is omitted, video camera source 1 is used as default (AXIS 2401 must be set to 1).

-zoom Specifies the zoom value of the selected camera source, i.e. 1 - 999.
> Note that this option is device dependent and is supported by Sony, Canon and Videmech drivers only.

-move Specifies in which direction the selected camera source shall be moved, i.e. home, up, upleft, left, downleft, down, downright, right, upright. Note that the move home option is only supported by the drivers Sony, Canon and Videmech.

-pan Specifies the pan angle of the selected camera source,
> i.e. -180 - 180. Note that this option is device dependent and is supported by the drivers Sony, Canon and Videmech.

-tilt Specifies the tilt angle of the selected camera source,
> i.e. -180 - 180. Note that this option is device dependent and is supported by the drivers Sony, Canon and Videmech.

Example 1

```
# This command moves camera 1 up five degrees and zooms wide.
******:
ptz -cam 1 -zoom 1 -move up;
%
```

Example 2

```
# This command moves camera 1 to preset position 1.
******:
ptz -preset 1 -cam 1;
%
```

Note: The options must be entered in the following order:
-speed, -preset, -cam, -zoom, -move, -pan, -tilt
For example; ptz -tilt 10 -cam 4, will not work. You must enter, ptz -cam 4 -tilt 10.

relay

This command sets the relay on or off within the AXIS 2400/2401.

Syntax

```
relay [-on | -off];
```

Options

```
-on    sets the relay on.
-off   sets the relay off.
```

Example

```
# This command sets the relay ON when digital input I goes high:
* * * * * / II :
reset -on;
%
```

reset

This command resets the software or hardware of the AXIS 2400/2401.

Syntax

```
reset [-soft | -hard];
```

Options

-soft Reinitiates the AXIS 2400/2401 protocols.

-hard Performs a complete reboot of the AXIS 2400/2401.

Example

```
# This command will reset the hardware once a day.
0 0 * * * * :
reset -hard;
%
```

sleep

This command adds a pause to the programming script execution. The command is typically used if you want to assure that the previous command is finished before continuing the script.

Syntax

```
sleep <seconds>;
```

Options

```
<seconds>
```
Specifies the seconds to wait before proceeding with the next command in the event entry.

Example

```
# This command will result in a 30 seconds pause in the programming script execution.
* * * * * * :
sleep 30;
%
```

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